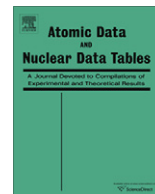




Contents lists available at ScienceDirect

Atomic Data and Nuclear Data Tables

journal homepage: www.elsevier.com/locate/adt

Atomic data and spectral line intensities for Ni XVII

A.K. Bhatia^a, E. Landi^{b,c,*}^aNASA/Goddard Space Flight Center, Greenbelt, MD 20771, USA^bNaval Research Laboratory, Washington, DC 20375, USA^cUniversity of Michigan, Ann Arbor, MI 48109, USA

ARTICLE INFO

Article history:

Available online 26 February 2011

ABSTRACT

Electron impact collision strengths, energy levels, oscillator strengths, and spontaneous radiative decay rates are calculated for Ni XVII. We include in the calculations the 23 lowest configurations, corresponding to 159 fine-structure levels: $3l3l'$, $3l4l''$, and $3s5l'''$, with $l, l' = s, p, d$, $l'' = s, p, d, f$, and $l''' = s, p, d$. Collision strengths are calculated at five incident energies for all transitions at varying energies above the threshold of each transition. One additional energy, very close to the threshold of each transition, has also been included. Calculations have been carried out using the Flexible Atomic Code in the distorted wave approximation. Additional calculations have been performed with the University College London suite of codes for comparison. Excitation rate coefficients are calculated as a function of electron temperature by assuming a Maxwellian electron velocity distribution. Using the excitation rate coefficients and the radiative transition rates of the present work, statistical equilibrium equations for level populations are solved at electron densities covering the range of $10^8 - 10^{14} \text{ cm}^{-3}$ and at an electron temperature of $\log T_e(\text{K}) = 6.5$, corresponding to the maximum abundance of Ni XVII. Spectral line intensities are calculated, and their diagnostic relevance is discussed. This dataset will be made available in the next version of the CHIANTI database.

© 2010 Published by Elsevier Inc.

* Corresponding author at: University of Michigan, Ann Arbor, MI 48109, USA.
Fax: +1 202 404 7997.

E-mail address: elandi@umich.edu (E. Landi).

Contents

1. Introduction	190
2. Atomic data	190
3. Comparison with previous calculations	191
4. Level populations and relative line intensities	192
5. Diagnostic relevance of Ni XVII lines	192
6. Conclusions	193
Acknowledgments	193
Appendix A. Supplementary data	193
References	193
Explanation of Tables	194
Tables	
1. Calculated and experimental energy levels and level lifetimes for Ni XVII	195
2. Ni XVII oscillator strengths, radiative decay rates, and collision strengths for transitions involving lower levels 1–4	197
3. Ni XVII oscillator strengths and radiative decay rates for transitions from all other levels	206
4. Ni XVII fractional level populations	221
5. Intensities of selected bright Ni XVII lines	224

1. Introduction

In a series of papers, we have recently calculated complete sets of atomic data and transition rates for high-energy configurations of Ni ions [1,2] and of Be-like ions [3–6] that emit in the soft X-ray wavelength range between 20 and 170 Å. These calculations include energy levels, radiative decay rates, and electron-ion excitation rate coefficients, and they were aimed at providing complete datasets needed to compute line emission in a wavelength range that has been neglected in the past, both regarding observations and theoretical calculations. The present paper calculates a similar set of data for Mg-like Ni (or Ni XVII).

Mg-like systems emit a very bright line from the $3s^2\ ^1S_0$ – $3s3p\ ^1P_1$ transition, that dominates the solar spectrum, as well as a host of weaker, but still bright and observable lines that populate the spectrum from soft X-ray to UV wavelengths. The Ni XVII 1S_0 – 1P_1 line has been routinely observed by the high resolution Hinode/EIS spectrometer in solar active regions, as well as many other times in the past. The weaker lines allow plasma diagnostics to be carried out through the analysis of their intensities and intensity ratios. In particular, intensity ratios of lines from different configurations are excellent temperature diagnostic tools.

Lines from Ni XVII have been observed on a number of occasions in the past, both in the laboratory and in solar plasmas. Laboratory measurements from many different devices provided line wavelengths [7–15] and level lifetimes [16–19]. A host of calculations have been performed to determine the radiative transition rates of an increasingly larger number of energy levels [20–26], but calculations of collisional excitation rates have been surprisingly scarce. Moreover, collision rates calculations were restricted to a small number of levels [27–30], so that the soft X-ray emission of many lines from the $n = 3$ complex as well as from the $n = 4, 5$ configurations were not included.

The aim of the present work is to provide a complete and accurate set of energy levels, radiative decay rates, and electron-ion collision excitation rate coefficients that allows us to calculate line emission from the low-energy as well as the highly excited configurations in Ni XVII. The present collisional calculation is the first one to include $n = 4$ and $n = 5$ configurations, as well as several configurations in the $n = 3$ complex. We compare our results with earlier calculations, and we also investigate the diagnostic potential of Ni XVII lines.

2. Atomic data

The Flexible Atomic Code (FAC) is a relativistic configuration interaction program [31]. The radial wavefunctions for single-electron orbitals are obtained with a self-consistent field method based

on the Dirac formulation. The Dirac–Coulomb Hamiltonian is diagonalized to obtain energy levels and atomic state wavefunctions. We have included in the atomic model the configurations $3l3l'$, $3l4l''$, and $3s5l'''$, with $l, l' = s, p, d$, $l'' = s, p, d, f$, and $l''' = s, p, d$, corresponding to 159 fine-structure energy levels. Electric and magnetic dipole transitions and electric and magnetic quadrupole transitions have been calculated and summed to provide the total radiative decay value for every transition made possible by all levels in the model. The calculated energies and lifetimes of the levels are listed in Table 1.

Energy values and radiative decay rates have also been calculated using the SUPERSTRUCTURE program [32] for comparison. We have carried out the calculations with the same atomic model as used in the FAC calculation, which we will refer to as SST-1, as well as a more restricted model (which we will call SST-2) that includes the $3l3l'$, $3s4l''$, and $3p4p$ configurations, for a total of 61 levels. The SST-2 model has been used to study the effect of omitting several configurations in the atomic model. The wavefunctions are of a configuration interaction type and each configuration is expanded in terms of Slater orbitals. The radial functions are calculated in a scaled Thomas–Fermi–Amaldi potential. The potential depends upon parameters λ which are determined variationally by optimizing the weighted sum of the term energies. The relativistic corrections are included by using the Breit–Pauli Hamiltonian as a perturbation to the nonrelativistic Hamiltonian. Energy levels, oscillator strengths, and radiative transition rates are calculated in intermediate coupling.

Both the FAC and the University College London (UCL) codes solve the scattering problem in the distorted wave approximation. The approach of the FAC is described by Gu [31]. The UCL codes use the programs described by Eissner and Seaton [33] and Eissner [34]. In the UCL codes, the reactance matrices at several incident energies are calculated in *LS* coupling. The collision strengths in intermediate coupling are calculated by using these reactance matrices and term-coupling coefficients obtained from structure calculations in the program JAJOM, developed by Saraph [35] and modified by Saraph and Eissner [36], to calculate collision strengths below the thresholds as well. Due to computer memory limitations, collision strengths were calculated with the UCL code using only the SST-2 model.

The incident electron energies were chosen to encompass a wide range. The FAC calculations were carried out using incident energies of 12.8, 29.9, 53.0, 83.9, and 124.5 Ry above the threshold of each transition. An additional energy, E' , was added to better describe the near threshold behavior, whose value is around 20–80 times smaller than the transition energy. The energies of

[illegible]

Table B

Comparison of measured and predicted lifetimes in ps. H87: [18], T88: [17], FAC: present calculation, with FAC. SST-1: present calculation, with SUPERSTRUCTURE and the same atomic model as FAC. SST-2: present calculations, applying SUPERSTRUCTURE to a reduced atomic model. C86: [28], B80: [27].

Level	H87	T88	FAC	SST-1	SST-2	B80	C86
3s3p 1P_1	31 ± 6		36.3	36.6	36.6	31.7	36.4
3p 2 1D_2	166 ± 20		164	154	156	180	160
3p ² 3P_1	50 ± 10		43.0	43.3	42.7	38.9	45.5
3s3p 3P_1	12,000 ± 1000	12,000 ± 1000	12,700	13,000	13,400	17,100	12,000

for these the Froese Fischer [21] results show slightly larger departures from the present results and those obtained by Aggarwal et al. [26]. The lifetimes calculated using our A values are in excellent agreement with those provided by Aggarwal et al. [26], with differences below 5% for almost all the levels with only nine exceptions, for which differences range between 6% and 25% at maximum.

A comparison between predicted and measured lifetimes is given in Table B. Very good agreement with observations is found for all levels with only a few exceptions. The FAC calculation (the most complete we have done in this work) is in excellent agreement with observations.

Comparison of electron collision excitation rates can be carried out with a far smaller sample of calculations. The only results available to us are those from the UCL suite of codes by Christensen et al. [28] and Bhatia and Kastner [27]. In both cases the calculations were carried out using the distorted wave approximation, but Christensen et al. [28] applied some approximate corrections to their results in an effort to include at least part of the effects of resonant excitation. Their collision strengths have been compared to those we obtained both with the FAC and with the UCL suite of codes, the latter using the SST-2 model. Resonant excitation has been taken fully into account in the calculations carried out by Hudson et al. [30], which are unavailable as we write. Hudson et al. [30] find that resonances play an important role in greatly enhancing the effective collision strengths of a number of transitions.

Comparison between the present results and the distorted wave calculations carried out here with the UCL codes (SST-2 model) and by Bhatia and Kastner [27] for the lowest four configurations shows an overall good agreement for the vast majority of the transitions. In only a few cases the FAC code provided slightly lower results, and most of these cases involved the 3p² 3P_0 level. Comparison between the FAC and SST-2 results for the higher levels also shows an overall agreement. There are a few transitions which can differ by a factor of two, and these have the upper level in the 3d² configuration. The reason is likely due to the more limited number of configurations included in the SST-2 model. In these cases, the FAC results are usually lower than those of the UCL code. The comparison with the collision strengths calculated by Christensen et al. [28] also shows excellent agreement, with only a few exceptions where those collision strengths [28] are slightly larger than those in the present work. There are only two transitions that present significant problems, whose origin is unclear. It is interesting to note that Christensen et al. [28] tried to take into account the contribution of resonant excitation in an approximate way, but the final result is in agreement with the present results. Clearly, a more complete and accurate treatment of resonant excitation is needed.

4. Level populations and relative line intensities

In the absence of absorption of solar blackbody radiation and proton excitation, the level populations are obtained by solving the equations

$$\begin{aligned} \frac{dN_i}{dt} = & -N_e N_i \left(\sum_{j>i} C_{ij}^e + \sum_{j<i} C_{ij}^d \right) + \sum_{j>i} N_j A_{ji} - N_i \sum_{j<i} A_{ij} \\ & + N_e \left(\sum_{j>i} N_j C_{ji}^d + \sum_{j<i} N_j C_{ji}^e \right), \\ \frac{dN_i}{dt} = & 0 \quad \text{for steady state,} \end{aligned} \quad (3)$$

where N_j is the number density of level j , N_e is the electron density, and A_{ji} (s^{-1}) is the spontaneous radiative transition rate from level j to level i . The equations have been solved at electron densities of $\log N_e(\text{cm}^{-3}) = 6, 7, 8, 9, 10, 11, 12, 13$, and 14.

Level populations and line intensities of various lines at $\log T_e = 6.5$, the temperature of maximum abundance of Ni XVII [38], are given in Tables 4 and 5, respectively. The intensity of an optically thin line for a radiative transition from level j to level i is given by $I_{ji} = n_j A_{ji}$ in photon units. Line intensities have been calculated and the values for the brightest lines are listed in Table 5 as a function of density.

Photoexcitation from background blackbody radiation has negligible effects on Ni XVII level populations for blackbody temperatures of 6000 K, typical of the Sun and solar-type stars.

5. Diagnostic relevance of Ni XVII lines

The Ni XVII spectrum is dominated by the very bright 3s² 1S_0 –3s3p 1P_1 line at 249.19 Å, and this line is routinely observed by the Hinode/EIS spectrometer [39] in active regions. This line has a very moderate density sensitivity, so that it is ideal for determining the emission measure of active region plasmas, a quantity related to the total amount of material in the emitting plasma. Also, this line is formed at slightly higher temperatures than 2.5 MK, and can thus be used to draw intensity maps of the hottest parts of the active regions. This line has also been observed in past missions devoted to solar studies. Thomas and Neupert [40] also identified the 3s² 1S_0 –3s3p 3P_1 intercombination line at 366.79 Å in an active region and the ratio with the 249.19 Å line is density insensitive at typical active region densities. The measured value of the 366/249 intensity ratio is 0.039 ± 0.009 (when intensities are in energy units), in excellent agreement with the predicted value of 0.032. For comparison, the intensity ratio predicted using the dataset of Christensen et al. [28] is 0.022.

Several spectral features in the extreme ultraviolet wavelength range, emitted by the 3p² and 3s3d configurations, provide density sensitive lines that, when combined with other lines from the 3s3p, 3p², and 3s3d configurations provide excellent density diagnostic ratios. These lines are included in the 190–270 Å wavelength range and even if they are not prominent in solar spectra, they can provide valuable information on the density of active region plasmas. Density diagnostics are not possible using ratios among the X-ray lines emitted by the $n = 4$ configurations, as the density sensitivity of those lines, if any, is very limited.

Temperature diagnostics can be carried out using line ratios involving $n = 4$ lines, since they are emitted by transitions from high-energy configurations. Ratios between one $n = 3$ line and one $n = 4$ line are very strongly temperature sensitive. However,

these lines are located in different regions of the solar spectrum that can only be observed simultaneously with difficulty. The only solar observations that could have observed both groups of lines [41] unfortunately identified only the 249.19 Å line. Ratios among $n = 4$ lines are less sensitive, yet they can still be used to estimate the electron temperature. Unfortunately, the lines reported by Acton et al. [42] are either blended or with an uncertain identification and cannot be used to measure the electron temperature of the flaring active region they observed. The 30–170 Å spectral range is a very rich but relatively unexplored region of the solar spectrum and future high resolution spectral observations in this range are strongly recommended.

6. Conclusions

In the present work, we have calculated a complete set of level energies, oscillator strengths, A values, and collision strengths for the lowest 23 configurations of Ni XVII, corresponding to 159 fine-structure levels. We have compared the radiative rates and collisional electron rate coefficients we obtained with results from other calculations for a few transitions. Our calculations are the first complete calculations that provide data to calculate transitions from the $n = 4$ complex. We discuss the plasma diagnostic potential of our data for measuring plasma parameters.

The present results will be distributed in the next release of the CHIANTI database [43,44]. We hope that the present results will be useful for the analysis of laboratory and astrophysical spectra.

Acknowledgments

The work of Enrico Landi is supported by the NNN06CD24C, NNG04ED07P, and other NASA Grants. Calculations were carried out using the Discover computer of the NASA Center for Computation Science.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.adt.2010.07.001](https://doi.org/10.1016/j.adt.2010.07.001).

References

- [1] E. Landi, A.K. Bhatia, At. Data Nucl. Data Tables 95 (2009) 547.
- [2] E. Landi, A.K. Bhatia, At. Data Nucl. Data Tables 96 (2010) 52.
- [3] A.K. Bhatia, E. Landi, At. Data Nucl. Data Tables 93 (2007) 245.
- [4] A.K. Bhatia, E. Landi, At. Data Nucl. Data Tables 94 (2008) 223.
- [5] A.K. Bhatia, E. Landi, At. Data Nucl. Data Tables 95 (2009) 155.
- [6] E. Landi, A.K. Bhatia, At. Data Nucl. Data Tables 94 (2008) 1.
- [7] S.O. Kastner, M. Swartz, A.K. Bhatia, J. Lapides, J. Opt. Soc. Am. 68 (1978) 1558.
- [8] S.S. Churilov, E.Ya. Kononov, A.N. Ryabtsev, Yu.F. Zayikin, Phys. Scr. 32 (1985) 501.
- [9] S.S. Churilov, V.E. Levashov, J.F. Wyart, Phys. Scr. 40 (1989) 625.
- [10] U. Feldman, L. Katz, W. Behring, L. Cohen, J. Opt. Soc. Am. 61 (1971) 91.
- [11] B.C. Fawcett, R.W. Hayes, R.D. Cowan, J. Phys. B 5 (1972) 2143.
- [12] B.C. Fawcett, R.W. Hayes, J. Phys. B 5 (1972) 366.
- [13] M. Finkenthal, E. Hinnov, S. Cohen, S. Suckewer, Phys. Lett. A 91 (1982) 284.
- [14] A. Redfors, Phys. Scr. 38 (1988) 702.
- [15] U. Litzen, A. Redfors, Phys. Scr. 36 (1987) 895.
- [16] R.R. Haar, L.J. Curtis, N. Reistad, C. Jupen, I. Martinson, B.M. Johnson, K.W. Jones, M. Meron, Phys. Scr. 35 (1987) 296.
- [17] E. Träbert, P.H. Heckmann, R. Hutton, I. Martinson, J. Opt. Soc. Am. B 5 (1988) 2173.
- [18] R. Hutton, N. Reistad, I. Martinson, E. Träbert, P.H. Heckmann, J.H. Blanke, H.M. Hellmann, R. Huckle, Phys. Scr. 35 (1987) 300.
- [19] R. Hutton, Phys. Scr. T73 (1997) 25.
- [20] B.C. Fawcett, At. Data Nucl. Data Tables 28 (1983) 579.
- [21] C. Froese Fischer, Unpublished calculations available at <http://atoms.vuse.vanderbilt.edu/>.
- [22] T.K. Krueger, S.J. Czyzak, Astrophys. J. 144 (1966) 1194.
- [23] U.I. Safronova, W.R. Johnson, H.G. Berry, Phys. Rev. A 61 (2000) 052503.
- [24] R. Das, N.C. Deb, K. Roy, A.Z. Msezane, Phys. Scr. 67 (2003) 401.
- [25] M. Stanek, L. Glowacki, J. Migdalek, J. Phys. B 29 (1996) 2985.
- [26] K.M. Aggarwal, V. Tayal, G.P. Gupta, F.P. Keenan, At. Data Nucl. Data Tables 93 (2007) 615.
- [27] A.K. Bhatia, S.O. Kastner, Sol. Phys. 65 (1980) 181.
- [28] R.B. Christensen, D.W. Norcross, A.K. Pradhan, Phys. Rev. A 34 (1986) 4704.
- [29] A.K. Pradhan, At. Data Nucl. Data Tables 40 (1988) 335.
- [30] C.E. Hudson, P.H. Norrington, C.A. Ramsbottom, J. Phys. Conf. Ser. 163 (2009) 012060.
- [31] M.F. Gu, Astrophys. J. 582 (2003) 1241.
- [32] W. Eissner, M. Jones, H. Nussbaumer, Comput. Phys. Commun. 8 (1974) 270.
- [33] W. Eissner, M.J. Seaton, J. Phys. B 5 (1972) 2187.
- [34] W. Eissner, Comput. Phys. Commun. 114 (1998) 295.
- [35] H.E. Saraph, Comput. Phys. Commun. 15 (1978) 247.
- [36] H.E. Saraph, W. Eissner, Comput. Phys. Commun., in press.
- [37] A. Burgess, J.A. Tully, Astron. Astrophys. 254 (1992) 436.
- [38] P. Mazzotta, G. Mazzitelli, S. Colafrancesco, N. Vittorio, Astron. Astrophys. Suppl. 133 (1998) 403.
- [39] J.L. Culhane, L.K. Harra, A.M. James, K. Al-Janabi, L.J. Bradley, R.A. Chaudry, K. Rees, J.A. Tandy, P. Thomas, M.C.R. Whillock, B. Winter, G.A. Doschek, C.M. Korendyke, C.M. Brown, S. Myers, J. Mariska, J. Seely, J. Lang, B.J. Kent, B.M. Shaughnessy, P.R. Young, G.M. Simnet, C.M. Castelli, S. Mahmoud, H. Mapson-Menard, B.J. Probyn, R.J. Thomas, J. Davila, K. Dere, D. Windt, R. Hagood, R. Moye, H. Hara, T. Watanabe, K. Matsuzaki, T. Kosugi, V. Hansteen, O. Wikstol, Sol. Phys. 243 (2007) 19.
- [40] R.J. Thomas, W. Neupert, Astrophys. J. 91 (1994) 461.
- [41] M. Malinovsky, L. Heroux, Astrophys. J. 181 (1973) 1009.
- [42] L.W. Acton, M.E. Bruner, W.A. Brown, B.C. Fawcett, W. Schweizer, R.J. Speer, Astrophys. J. 291 (1985) 865.
- [43] K.P. Dere, E. Landi, H.E. Mason, B.C. Monsignori Fossi, P.R. Young, Astron. Astrophys. Suppl. 125 (1997) 149.
- [44] K.P. Dere, E. Landi, P.R. Young, G. Del Zanna, M. Landini, H.E. Mason, Astron. Astrophys. Suppl. 4985 (2009) 91.

Explanation of Tables

Table 1. Calculated and experimental energy levels and level lifetimes for Ni XVII

Level	A number assigned to each level
Configuration	The configuration, with $1s^2 2s^2 2p^6$ truncated
Term	The term designation of the level within the configuration
E_{obs}	Measured energies, from laboratory and solar spectra
E_{calc}	Calculated energy, in cm^{-1}
Source	Original source of the observed energy. C85, Churilov et al. [8]; C85 + R88, average of Churilov et al. [8] and Redfors [14]; F71, Feldman et al. [10]; A85, Acton et al. [42]; F72, Fawcett et al. [11]
Lifetime	Calculated level lifetime, in s^{-1}

Table 2. Ni XVII oscillator strengths, radiative decay rates, and collision strengths for transitions involving lower levels 1–4

Lower and upper level	The lower and upper levels, where the numbers refer to the Level listed in Table 1
Oscillator strength	gf , the (dimensionless) product of the statistical weight g of the lower level and the absorption oscillator strength f
Radiative decay rate	The spontaneous radiative decay rate A_{ji} in units of s^{-1}
Collision strength	The dimensionless electron impact collision strength Ω at the energy above threshold (in Ry) given in the table heading. Transition thresholds E_0 can be calculated from Table 1. The lowest energy (E') changes depending to the transition levels: $E' = 0.005$ Ry (transition 3–4); $E' = 0.025$ Ry (transitions 3–5, 4–5); $E' = 0.13$ (transitions 1–2 to 1–24, 2–3 to 2–26, 3–6 to 3–26, 4–6 to 4–26); $E' = 0.42$ (transitions 1–25, 1–26 and all transitions with upper levels 27–159)

Table 3. Ni XVII oscillator strengths and radiative decay rates for transitions from all other levels

Lower and upper level	The lower and upper levels, where the numbers refer to the Level listed in Table 1
Oscillator strength	gf , the (dimensionless) product of the statistical weight g of the lower level and the absorption oscillator strength f
Radiative decay rate	The spontaneous radiative decay rate A_{ji} in units of s^{-1}

Table 4. Ni XVII fractional level populations

Den.	The electron density in cm^{-3} , in log values
Key	A number assigned to each level as given in Table 1
Population	The fractional level population n_j as a function of electron density for an electron temperature of $\log T_e(\text{K}) = 6.5$: the sum of all fractional level populations is defined as unity

Table 5. Intensities of selected bright Ni XVII lines

Den.	The electron density in cm^{-3} , in log values
j and i	The upper and lower levels, where numbers refer to the Level listed in Table 1
Wavelength	The wavelengths in units of \AA calculated from observed energies (when available) or theoretical energies
Intensity	The intensity ($n_j A_{ji}$ in units of photon/s) for the indicated density given in the table heading and for an electron temperature of $\log T_e(\text{K}) = 6.5$

Table 1

Calculated and experimental energy levels and level lifetimes for Ni XVII. See page 194 for Explanation of Tables.

Level	Configuration	Term	E_{obs}	E_{calc}	Source	Lifetime
1	3s ²	¹ S ₀	0	0		
2	3s3p	³ P ₀	264,431	263,683	C85	
3	3s3p	³ P ₁	272,634	271,914	C85	1.266–08
4	3s3p	³ P ₂	293,686	292,777	C85	7.900–03
5	3s3p	¹ P ₁	401,308	405,885	C85	3.627–11
6	3p ²	³ P ₀	627,914	630,702	C85	4.680–11
7	3p ²	¹ D ₂	638,820	639,712	C85	1.636–10
8	3p ²	³ P ₁	643,807	646,273	C85	4.295–11
9	3p ²	³ P ₂	669,535	671,370	C85	4.656–11
10	3p ²	¹ S ₀	754,513	761,002	C85	3.954–11
11	3s3d	³ D ₁	771,268	772,957	C85	3.494–11
12	3s3d	³ D ₂	772,953	774,568	C85	3.649–11
13	3s3d	³ D ₃	775,567	777,098	C85	3.953–11
14	3s3d	¹ D ₂	864,465	872,950	C85	1.977–11
15	3p3d	³ F ₂	1,053,937	1,054,661	C85	1.329–10
16	3p3d	³ F ₃	1,068,632	1,069,219	C85	1.511–10
17	3p3d	¹ D ₂	1,081,126	1,082,416	C85	4.523–11
18	3p3d	³ F ₄	1,086,107	1,086,473	C85	1.398–10
19	3p3d	³ D ₁	1,116,134	1,119,354	C85	2.162–11
20	3p3d	³ P ₂	1,118,392	1,121,712	C85	2.541–11
21	3p3d	³ D ₃	1,133,775	1,137,319	C85	2.093–11
22	3p3d	³ P ₀	1,135,732	1,139,127	C85	2.612–11
23	3p3d	³ P ₁	1,136,123	1,139,502	C85	2.450–11
24	3p3d	³ D ₂	1,136,643	1,140,058	C85	2.330–11
25	3p3d	¹ F ₃	1,209,017	1,218,102	C85	1.956–11
26	3p3d	¹ P ₁	1,222,730	1,233,196	C85	2.133–11
27	3d ²	³ F ₂	1,557,810	1,560,086	C85	2.116–11
28	3d ²	³ F ₃	1,560,488	1,562,733	C85 + R88	2.217–11
29	3d ²	³ F ₄	1,563,803	1,565,913	C85 + R88	2.349–11
30	3d ²	¹ D ₂	1,594,821	1,600,153	C85	1.793–11
31	3d ²	³ P ₀	1,597,124	1,601,937	C85	1.693–11
32	3d ²	³ P ₁	1,598,889	1,602,969	C85	1.724–11
33	3d ²	³ P ₂	1,601,729	1,605,875	C85	1.853–11
34	3d ²	¹ G ₄	1,601,402	1,607,581	C85 + R88	3.661–11
35	3d ²	¹ S ₀		1,702,867		1.389–11
36	3s4s	³ S ₁	2,187,508	2,184,251	F71	1.940–12
37	3s4s	¹ S ₀	2,214,216	2,212,585	A85	2.930–12
38	3s4p	³ P ₀		2,320,217		9.188–12
39	3s4p	³ P ₁		2,320,851		3.764–12
40	3s4p	³ P ₂		2,331,256		9.494–12
41	3s4p	¹ P ₁	2,331,763	2,331,774	F71	2.045–12
42	3s4d	³ D ₁	2,494,027	2,491,870	F71	1.324–12
43	3s4d	³ D ₂	2,495,134	2,493,028	F71	1.364–12
44	3s4d	³ D ₃	2,497,293	2,494,926	F71	1.366–12
45	3s4d	¹ D ₂	2,499,372	2,496,902	F72	2.251–12
46	3p4s	³ P ₀		2,511,657		2.933–12
47	3p4s	³ P ₁		2,516,483		2.746–12
48	3p4s	³ P ₂		2,541,347		2.915–12
49	3p4s	¹ P ₁		2,557,383		1.962–12
50	3s4f	³ F ₂	2,584,834	2,584,094	F71	7.038–13
51	3s4f	³ F ₃	2,585,204	2,584,419	F71	7.034–13
52	3s4f	³ F ₄	2,585,522	2,584,878	F71	7.032–13
53	3s4f	¹ F ₃	2,601,369	2,603,851	F72	7.182–13
54	3p4p	³ D ₁		2,628,018		3.001–12
55	3p4p	¹ P ₁		2,647,447		2.972–12
56	3p4p	³ D ₂		2,649,188		3.572–12
57	3p4p	³ P ₀		2,653,608		2.666–12
58	3p4p	³ P ₁		2,667,114		2.708–12
59	3p4p	³ D ₃		2,671,813		3.564–12
60	3p4p	³ P ₂		2,676,835		2.634–12
61	3p4p	³ S ₁		2,679,879		2.649–12
62	3p4p	¹ D ₂		2,699,141		2.199–12
63	3p4p	¹ S ₀		2,733,898		2.790–12
64	3p4d	³ F ₂		2,811,050		5.103–12
65	3p4d	³ D ₁		2,811,370		1.173–12
66	3p4d	³ D ₂		2,812,353		1.427–12
67	3p4d	³ F ₃		2,814,311		1.534–12
68	3p4d	¹ D ₂		2,836,356		3.000–12
69	3p4d	³ D ₃		2,838,390		1.769–12
70	3p4d	³ F ₄		2,846,798		2.907–11
71	3p4d	¹ F ₃		2,847,821		1.187–12
72	3p4d	³ P ₂		2,850,966		1.980–12
73	3p4d	³ P ₁		2,852,105		1.701–12

Table 1 (continued)

Level	Configuration	Term	E_{obs}	E_{calc}	Source	Lifetime
74	3p4d	³ P ₀		2,857,336		2.097–12
75	3p4d	¹ P ₁		2,862,465		1.519–12
76	3p4f	³ G ₃		2,890,495		6.758–13
77	3p4f	³ F ₃		2,899,589		6.980–13
78	3p4f	³ G ₄	2,899,128	2,899,741	F72	6.923–13
79	3p4f	³ F ₂		2,904,024		7.195–13
80	3p4f	¹ F ₃		2,919,823		6.942–13
81	3p4f	³ G ₅	2,922,654	2,922,549	F72	6.650–13
82	3p4f	³ F ₄		2,923,299		7.044–13
83	3p4f	³ D ₃		2,935,829		6.525–13
84	3p4f	³ D ₂		2,939,550		6.401–13
85	3p4f	³ D ₁		2,943,679		6.193–13
86	3p4f	¹ G ₄	2,949,025	2,958,113	F72	8.213–13
87	3p4f	¹ D ₂		2,965,461		6.902–13
88	3d4s	³ D ₁		2,975,999		3.697–12
89	3d4s	³ D ₂		2,977,218		3.268–12
90	3d4s	³ D ₃		2,980,054		3.154–12
91	3d4s	¹ D ₂		2,990,535		2.568–12
92	3d4p	¹ D ₂		3,093,378		2.633–12
93	3d4p	³ D ₁		3,099,621		2.249–12
94	3d4p	³ D ₂		3,101,129		2.472–12
95	3d4p	³ F ₃		3,103,781		2.634–12
96	3d4p	³ F ₂		3,105,277		2.658–12
97	3d4p	³ D ₃		3,109,427		2.628–12
98	3d4p	³ F ₄		3,113,569		3.192–12
99	3s5s	³ S ₁		3,119,662		3.034–12
100	3d4p	³ P ₁		3,120,953		2.468–12
101	3d4p	³ P ₂		3,121,750		2.462–12
102	3d4p	³ P ₀		3,121,820		2.483–12
103	3s5s	¹ S ₀		3,131,128		2.856–12
104	3d4p	¹ F ₃		3,136,715		1.891–12
105	3d4p	¹ P ₁		3,141,324		2.734–12
106	3s5p	³ P ₀		3,184,965		7.583–12
107	3s5p	³ P ₁		3,186,312		6.976–12
108	3s5p	³ P ₂		3,190,310		8.035–12
109	3s5p	¹ P ₁		3,200,292		2.096–12
110	3d4d	¹ F ₃		3,250,967		1.668–12
111	3d4d	³ D ₁		3,254,928		1.622–12
112	3d4d	³ D ₂		3,256,731		1.639–12
113	3d4d	³ G ₃		3,258,592		1.791–12
114	3d4d	³ D ₃		3,259,222		1.808–12
115	3d4d	³ G ₄		3,261,100		1.993–12
116	3d4d	¹ P ₁		3,263,366		1.499–12
117	3d4d	³ G ₅		3,264,284		1.991–12
118	3s5d	³ D ₂	3,272,418	3,269,994	F71	2.157–12
119	3s5d	³ D ₁	3,272,040	3,270,055	F71	2.152–12
120	3s5d	¹ D ₂	3,272,418	3,270,978	F71	2.147–12
121	3s5d	³ D ₃	3,272,802	3,271,147	F71	2.135–12
122	3d4d	³ S ₁		3,278,257		1.539–12
123	3d4d	³ F ₂		3,282,652		1.566–12
124	3d4d	³ F ₃		3,284,619		1.561–12
125	3d4d	³ F ₄		3,286,949		1.557–12
126	3d4d	³ P ₀		3,305,601		1.794–12
127	3d4d	¹ G ₄		3,305,619		1.711–12
128	3d4d	³ P ₂		3,306,293		1.761–12
129	3d4d	³ P ₁		3,306,424		1.791–12
130	3s5f	³ F ₂	3,312,822	3,309,727	F71	1.301–12
131	3s5f	³ F ₃	3,312,765	3,309,865	F71	1.302–12
132	3d4d	¹ D ₂	3,310,780	3,309,951	F71	1.728–12
133	3s5f	³ F ₄	3,312,672	3,310,066	F71	1.303–12
134	3s5f	¹ F ₃		3,314,725		1.248–12
135	3s5g	³ G ₃		3,324,245		2.586–12
136	3s5g	³ G ₄		3,324,395		2.585–12
137	3s5g	³ G ₅		3,324,593		2.584–12
138	3d4f	¹ G ₄		3,333,131		3.589–12
139	3s5g	¹ G ₄		3,333,766		1.818–12
140	3d4f	³ H ₄		3,335,635		4.252–12
141	3d4f	³ H ₅		3,336,735		5.281–11
142	3d4f	³ H ₆		3,338,977		6.627–11
143	3d4f	³ F ₂		3,343,433		1.140–12
144	3d4f	³ F ₃		3,344,691		1.147–12
145	3d4f	³ F ₄		3,345,920		1.161–12
146	3d4f	¹ D ₂		3,356,213		8.743–13
147	3d4d	¹ S ₀		3,360,236		2.091–12
148	3d4f	³ G ₃		3,370,163		4.306–13

(continued on next page)

Table 1 (continued)

Level	Configuration	Term	E_{obs}	E_{calc}	Source	Lifetime
149	3d4f	3G_4		3,372,095		4.305–13
150	3d4f	3G_5		3,373,647		4.302–13
151	3d4f	3D_1		3,376,991		5.912–13
152	3d4f	3D_2		3,377,243		6.007–13
153	3d4f	3D_3		3,377,807		5.836–13
154	3d4f	3P_2		3,381,729		7.214–13
155	3d4f	3P_1		3,382,846		7.335–13
156	3d4f	3P_0		3,383,548		7.451–13
157	3d4f	1F_3		3,390,182		5.200–13
158	3d4f	1P_1		3,414,649		6.612–13
159	3d4f	1H_5		3,415,735		3.705–13

Table 2

Ni XVII oscillator strengths, radiative decay rates, and collision strengths for transitions involving lower levels 1–4. See page 194 for Explanation of Tables.

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – E ₀ (Ry)					
<i>i</i>	<i>j</i>	<i>gf</i>	(1/s)	<i>E'</i>	12.8	29.9	53.0	83.9	124.5
1	2			3.121 e–03	1.948 e–03	1.157 e–03	6.791 e–04	3.977 e–04	2.331 e–04
1	3	4.806 e–03	7.901 e+07	3.423 e–02	3.534 e–02	3.736 e–02	3.996 e–02	4.285 e–02	4.572 e–02
1	4		5.549 e+00	1.528 e–02	9.519 e–03	5.657 e–03	3.324 e–03	1.949 e–03	1.143 e–03
1	5	7.527 e–01	2.757 e+10	2.283 e+00	2.678 e+00	3.057 e+00	3.426 e+00	3.778 e+00	4.108 e+00
1	6			3.146 e–05	2.151 e–05	1.576 e–05	1.249 e–05	1.065 e–05	9.643 e–06
1	7		1.873 e+05	6.218 e–02	6.827 e–02	7.265 e–02	7.575 e–02	7.797 e–02	7.965 e–02
1	8			6.260 e–05	3.453 e–05	1.866 e–05	9.931 e–06	5.277 e–06	2.926 e–06
1	9		6.550 e+04	1.689 e–02	1.859 e–02	1.982 e–02	2.069 e–02	2.132 e–02	2.179 e–02
1	10			1.006 e–04	9.620 e–05	9.260 e–05	8.970 e–05	8.714 e–05	8.514 e–05
1	11			6.554 e–03	4.288 e–03	2.659 e–03	1.576 e–03	9.107 e–04	5.213 e–04
1	12			1.094 e–02	7.168 e–03	4.437 e–03	2.648 e–03	1.538 e–03	8.862 e–04
1	13			1.528 e–02	1.000 e–02	6.204 e–03	3.678 e–03	2.126 e–03	1.217 e–03
1	14		2.115 e+06	1.355 e–01	1.530 e–01	1.659 e–01	1.753 e–01	1.822 e–01	1.872 e–01
1	15			9.937 e–05	6.223 e–05	3.724 e–05	2.160 e–05	1.232 e–05	6.976 e–06
1	16			1.497 e–04	9.861 e–05	6.436 e–05	4.308 e–05	3.078 e–05	2.403 e–05
1	17			4.446 e–05	2.625 e–05	1.461 e–05	7.821 e–06	4.114 e–06	2.174 e–06
1	18			1.673 e–04	1.054 e–04	6.344 e–05	3.701 e–05	2.123 e–05	1.207 e–05
1	19			3.085 e–05	1.881 e–05	1.116 e–05	6.911 e–06	4.697 e–06	3.715 e–06
1	20			5.933 e–05	3.619 e–05	2.089 e–05	1.165 e–05	6.405 e–06	3.557 e–06
1	21			6.279 e–05	4.178 e–05	2.911 e–05	2.255 e–05	1.970 e–05	1.880 e–05
1	22			1.367 e–05	8.607 e–06	5.149 e–06	2.983 e–06	1.702 e–06	9.770 e–07
1	23			3.637 e–05	2.264 e–05	1.336 e–05	7.708 e–06	4.390 e–06	2.578 e–06
1	24			5.111 e–05	3.102 e–05	1.780 e–05	9.859 e–06	5.390 e–06	2.980 e–06
1	25			1.163 e–03	1.305 e–03	1.433 e–03	1.557 e–03	1.671 e–03	1.766 e–03
1	26	1.354 e–03	4.578 e+08	5.345 e–04	6.551 e–04	7.840 e–04	9.236 e–04	1.068 e–03	1.218 e–03
1	27			3.787 e–06	3.198 e–06	2.939 e–06	2.881 e–06	2.922 e–06	2.986 e–06
1	28			2.732 e–06	1.457 e–06	7.288 e–07	3.473 e–07	1.605 e–07	7.371 e–08
1	29			3.557 e–06	1.897 e–06	9.504 e–07	4.544 e–07	2.123 e–07	1.004 e–07
1	30		1.153 e+05	2.607 e–04	3.022 e–04	3.367 e–04	3.657 e–04	3.897 e–04	4.074 e–04
1	31			1.838 e–06	1.158 e–06	7.289 e–07	4.762 e–07	3.384 e–07	2.679 e–07
1	32			4.909 e–06	2.842 e–06	1.554 e–06	8.114 e–07	4.124 e–07	2.108 e–07
1	33		3.894 e+04	9.171 e–05	1.031 e–04	1.132 e–04	1.219 e–04	1.295 e–04	1.351 e–04
1	34			1.997 e–06	1.916 e–06	2.332 e–06	2.987 e–06	3.669 e–06	4.248 e–06
1	35			1.880 e–04	1.925 e–04	1.947 e–04	1.950 e–04	1.940 e–04	1.930 e–04
1	36			2.404 e–03	1.468 e–03	8.952 e–04	5.325 e–04	3.048 e–04	1.689 e–04
1	37			7.897 e–02	8.466 e–02	8.890 e–02	9.184 e–02	9.377 e–02	9.507 e–02
1	38			5.830 e–04	3.495 e–04	1.971 e–04	1.079 e–04	5.756 e–05	3.011 e–05
1	39	1.276 e–01	1.529 e+11	3.958 e–03	6.119 e–03	9.463 e–03	1.397 e–02	1.880 e–02	2.416 e–02
1	40		1.274 e+04	2.845 e–03	1.702 e–03	9.603 e–04	5.268 e–04	2.821 e–04	1.487 e–04
1	41	3.070 e–01	3.712 e+11	6.832 e–03	1.274 e–02	2.124 e–02	3.224 e–02	4.389 e–02	5.677 e–02
1	42			1.583 e–03	9.154 e–04	5.269 e–04	2.948 e–04	1.609 e–04	8.650 e–05
1	43		1.438 e+07	3.439 e–03	2.667 e–03	2.344 e–03	2.259 e–03	2.232 e–03	2.307 e–03
1	44			3.704 e–03	2.143 e–03	1.234 e–03	6.903 e–04	3.769 e–04	2.029 e–04
1	45		4.190 e+08	2.531 e–02	3.411 e–02	4.277 e–02	5.088 e–02	5.638 e–02	6.198 e–02
1	46			2.227 e–06	1.236 e–06	6.499 e–07	3.405 e–07	1.853 e–07	1.003 e–07
1	47	1.552 e–03	2.185 e+09	3.149 e–05	4.839 e–05	7.877 e–05	1.224 e–04	1.699 e–04	2.258 e–04
1	48			8.752 e–06	4.838 e–06	2.533 e–06	1.324 e–06	7.214 e–07	3.902 e–07
1	49	6.120 e–03	8.900 e+09	9.607 e–05	1.643 e–04	2.804 e–04	4.458 e–04	6.252 e–04	8.393 e–04
1	50			4.999 e–03	2.997 e–03	1.713 e–03	9.423 e–04	5.060 e–04	2.681 e–04
1	51			6.884 e–03	4.202 e–03	2.405 e–03	1.337 e–03	7.190 e–04	3.881 e–04
1	52			8.996 e–03	5.392 e–03	3.083 e–03	1.696 e–03	9.108 e–04	4.825 e–04
1	53			4.369 e–02	5.210 e–02	5.959 e–02	6.500 e–02	6.824 e–02	7.035 e–02
1	54			2.775 e–05	1.597 e–05	9.226 e–06	5.356 e–06	3.177 e–06	1.911 e–06
1	55			1.866 e–05	1.071 e–05	6.177 e–06	3.581 e–06	2.122 e–06	1.271 e–06
1	56		5.067 e+05	7.273 e–05	5.989 e–05	5.575 e–05	5.638 e–05	5.764 e–05	6.099 e–05
1	57			1.275 e–05	1.182 e–05	1.140 e–05	1.125 e–05	1.120 e–05	1.118 e–05
1	58			1.030 e–05	5.754 e–06	3.215 e–06	1.818 e–06	1.049 e–06	5.896 e–07
1	59			5.512 e–05	3.218 e–05	1.891 e–05	1.121 e–05	6.844 e–06	4.295 e–06
1	60		1.047 e+06	5.859 e–05	6.699 e–05	7.839 e–05	9.048 e–05	9.920 e–05	1.099 e–04
1	61			1.158 e–05	6.705 e–06	3.854 e–06	2.200 e–06	1.229 e–06	6.893 e–07
1	62		4.933 e+06	2.056 e–04	2.707 e–04	3.374 e–04	4.004 e–04	4.446 e–04	4.973 e–04
1	63			1.248 e–04	1.305 e–04	1.345 e–04	1.371 e–04	1.384 e–04	1.386 e–04
1	64			3.011 e–05	1.918 e–05	1.159 e–05	6.777 e–06	3.884 e–06	2.233 e–06
1	65	4.724 e–04	8.302 e+08	2.405 e–05	3.164 e–05	4.266 e–05	5.575 e–05	7.142 e–05	8.685 e–05
1	66			1.510 e–05	9.333 e–06	5.450 e–06	3.077 e–06	1.722 e–06	9.948 e–07
1	67			8.447 e–05	8.171 e–05	8.161 e–05	8.338 e–05	8.579 e–05	8.872 e–05
1	68			2.278 e–05	1.444 e–05	8.701 e–06	5.075 e–06	2.903 e–06	1.670 e–06
1	69			4.514 e–05	3.672 e–05	3.140 e–05	2.853 e–05	2.721 e–05	2.697 e–05
1	70			7.197 e–05	4.663 e–05	2.870 e–05	1.710 e–05	9.915 e–06	5.699 e–06
1	71			1.606 e–04	1.767 e–04	1.925 e–04	2.074 e–04	2.202 e–04	2.317 e–04
1	72			1.922 e–05	1.247 e–05	7.629 e–06	4.521 e–06	2.645 e–06	1.550 e–06
1	73	1.023 e–03	1.851 e+09	4.886 e–05	6.709 e–05	9.189 e–05	1.205 e–04	1.545 e–04	1.875 e–04

(continued on next page)

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – E ₀ (Ry)					
1	74			4.207 e–06	2.741 e–06	1.687 e–06	1.005 e–06	5.893 e–07	3.430 e–07
1	75	2.980 e–03	5.430 e+09	1.219 e–04	1.833 e–04	2.612 e–04	3.480 e–04	4.491 e–04	5.463 e–04
1	76			6.259 e–05	3.607 e–05	2.031 e–05	1.138 e–05	6.311 e–06	3.364 e–06
1	77			3.701 e–05	2.100 e–05	1.142 e–05	6.244 e–06	3.430 e–06	1.908 e–06
1	78			9.016 e–05	6.404 e–05	4.973 e–05	4.270 e–05	4.014 e–05	4.043 e–05
1	79		5.769 e+05	5.444 e–05	5.937 e–05	6.640 e–05	7.483 e–05	8.363 e–05	8.885 e–05
1	80			3.424 e–05	1.917 e–05	1.043 e–05	5.700 e–06	3.143 e–06	1.728 e–06
1	81			1.252 e–04	7.276 e–05	4.147 e–05	2.348 e–05	1.302 e–05	6.822 e–06
1	82			4.697 e–05	2.632 e–05	1.456 e–05	8.210 e–06	4.496 e–06	2.617 e–06
1	83			6.244 e–05	3.725 e–05	2.115 e–05	1.197 e–05	6.610 e–06	3.567 e–06
1	84		2.305 e+05	6.082 e–05	4.713 e–05	4.004 e–05	3.680 e–05	3.683 e–05	3.681 e–05
1	85			3.049 e–05	1.833 e–05	1.048 e–05	5.961 e–06	3.295 e–06	1.768 e–06
1	86			2.192 e–04	3.005 e–04	3.596 e–04	4.042 e–04	4.569 e–04	5.079 e–04
1	87		7.302 e+06	4.522 e–04	5.949 e–04	7.248 e–04	8.513 e–04	9.685 e–04	1.032 e–03
1	88			1.623 e–06	9.131 e–07	4.902 e–07	2.538 e–07	1.221 e–07	5.340 e–08
1	89			3.525 e–06	2.840 e–06	2.516 e–06	2.340 e–06	2.418 e–06	2.443 e–06
1	90			2.304 e–06	1.308 e–06	7.082 e–07	3.651 e–07	1.735 e–07	7.550 e–08
1	91		1.101 e+06	1.098 e–05	1.710 e–05	2.418 e–05	3.095 e–05	3.498 e–05	4.270 e–05
1	92			5.047 e–07	3.126 e–07	1.849 e–07	1.065 e–07	6.041 e–08	3.394 e–08
1	93	1.029 e–04	2.197 e+08	2.243 e–06	4.002 e–06	6.372 e–06	9.218 e–06	1.260 e–05	1.575 e–05
1	94			6.875 e–07	4.224 e–07	2.463 e–07	1.394 e–07	7.745 e–08	4.268 e–08
1	95			1.736 e–06	1.305 e–06	1.028 e–06	8.663 e–07	7.992 e–07	7.862 e–07
1	96			7.674 e–07	4.767 e–07	2.823 e–07	1.624 e–07	9.184 e–08	5.156 e–08
1	97			1.148 e–06	7.543 e–07	4.928 e–07	3.319 e–07	2.466 e–07	2.040 e–07
1	98			2.359 e–06	1.502 e–06	9.123 e–07	5.386 e–07	3.122 e–07	1.799 e–07
1	99			8.886 e–04	5.466 e–04	3.342 e–04	2.000 e–04	1.153 e–04	6.425 e–05
1	100	2.305 e–04	4.991 e+08	4.896 e–06	8.612 e–06	1.372 e–05	1.994 e–05	2.735 e–05	3.430 e–05
1	101			1.301 e–06	7.945 e–07	4.556 e–07	2.496 e–07	1.298 e–07	6.742 e–08
1	102			2.643 e–07	1.616 e–07	9.269 e–08	5.080 e–08	2.649 e–08	1.380 e–08
1	103			1.486 e–02	1.602 e–02	1.694 e–02	1.761 e–02	1.808 e–02	1.836 e–02
1	104			3.097 e–05	3.650 e–05	4.138 e–05	4.531 e–05	4.993 e–05	5.491 e–05
1	105	1.275 e–02	2.798 e+10	2.245 e–04	4.388 e–04	7.259 e–04	1.073 e–03	1.483 e–03	1.867 e–03
1	106			2.517 e–04	1.509 e–04	8.447 e–05	4.646 e–05	2.499 e–05	1.298 e–05
1	107	4.298 e–03	9.702 e+09	7.988 e–04	5.794 e–04	4.835 e–04	4.896 e–04	5.644 e–04	6.560 e–04
1	108		1.338 e+04	1.226 e–03	7.327 e–04	4.101 e–04	2.259 e–04	1.218 e–04	6.348 e–05
1	109	1.179 e–01	2.684 e+11	1.868 e–03	3.579 e–03	5.985 e–03	9.015 e–03	1.262 e–02	1.602 e–02
1	110			3.686 e–06	2.061 e–06	1.148 e–06	6.297 e–07	3.383 e–07	1.785 e–07
1	111			4.525 e–05	2.613 e–05	1.504 e–05	8.453 e–06	4.631 e–06	2.496 e–06
1	112			9.844 e–05	5.728 e–05	3.285 e–05	1.855 e–05	1.016 e–05	5.419 e–06
1	113			9.952 e–05	5.684 e–05	3.249 e–05	1.820 e–05	9.947 e–06	5.331 e–06
1	114			9.044 e–05	5.153 e–05	2.941 e–05	1.646 e–05	8.993 e–06	4.814 e–06
1	115			2.973 e–05	1.497 e–05	7.854 e–06	4.214 e–06	2.177 e–06	1.115 e–06
1	116			1.978 e–05	1.146 e–05	6.619 e–06	3.733 e–06	2.056 e–06	1.118 e–06
1	117			3.973 e–05	2.006 e–05	1.037 e–05	5.486 e–06	2.832 e–06	1.350 e–06
1	118		9.547 e+07	3.861 e–03	4.610 e–03	5.424 e–03	6.276 e–03	7.061 e–03	7.467 e–03
1	119			6.260 e–04	3.644 e–04	2.120 e–04	1.203 e–04	6.678 e–05	3.667 e–05
1	120		1.196 e+08	4.529 e–03	5.573 e–03	6.652 e–03	7.754 e–03	8.754 e–03	9.271 e–03
1	121			1.430 e–03	8.329 e–04	4.848 e–04	2.753 e–04	1.527 e–04	8.387 e–05
1	122			9.664 e–07	6.452 e–07	4.163 e–07	2.522 e–07	1.473 e–07	8.155 e–08
1	123		1.028 e+06	3.379 e–05	4.375 e–05	5.350 e–05	6.313 e–05	7.170 e–05	7.620 e–05
1	124			5.649 e–07	2.969 e–07	1.508 e–07	7.561 e–08	3.905 e–08	2.105 e–08
1	125			1.736 e–06	1.908 e–06	1.968 e–06	1.980 e–06	2.160 e–06	2.359 e–06
1	126			4.949 e–07	4.122 e–07	3.642 e–07	3.384 e–07	3.224 e–07	3.106 e–07
1	127			8.598 e–04	1.230 e–03	1.400 e–03	1.469 e–03	1.636 e–03	1.804 e–03
1	128		8.184 e+06	2.516 e–04	3.275 e–04	4.019 e–04	4.752 e–04	5.401 e–04	5.748 e–04
1	129			6.863 e–07	3.814 e–07	2.028 e–07	1.053 e–07	5.454 e–08	2.783 e–08
1	130			1.731 e–03	1.082 e–03	6.390 e–04	3.625 e–04	2.003 e–04	1.101 e–04
1	131			2.424 e–03	1.482 e–03	9.104 e–04	5.206 e–04	2.900 e–04	1.637 e–04
1	132		1.319 e+07	4.003 e–04	5.218 e–04	6.407 e–04	7.579 e–04	8.617 e–04	9.172 e–04
1	133			3.116 e–03	1.948 e–03	1.150 e–03	6.524 e–04	3.605 e–04	1.982 e–04
1	134			7.677 e–03	9.135 e–03	1.034 e–02	1.134 e–02	1.228 e–02	1.299 e–02
1	135			1.189 e–03	5.936 e–04	3.056 e–04	1.628 e–04	8.551 e–05	4.145 e–05
1	136			1.523 e–03	7.518 e–04	3.938 e–04	2.120 e–04	1.087 e–04	5.447 e–05
1	137			1.859 e–03	9.285 e–04	4.780 e–04	2.546 e–04	1.337 e–04	6.483 e–05
1	138			1.036 e–06	6.002 e–07	3.311 e–07	1.773 e–07	9.398 e–08	5.019 e–08
1	139			2.451 e–03	3.518 e–03	3.999 e–03	4.185 e–03	4.666 e–03	5.150 e–03
1	140			1.097 e–06	6.380 e–07	3.530 e–07	1.892 e–07	1.001 e–07	5.311 e–08
1	141			1.353 e–06	7.904 e–07	4.372 e–07	2.302 e–07	1.182 e–07	6.075 e–08
1	142			1.634 e–06	9.506 e–07	5.253 e–07	2.789 e–07	1.440 e–07	7.315 e–08
1	143			1.370 e–05	8.611 e–06	5.103 e–06	2.905 e–06	1.620 e–06	9.076 e–07
1	144			1.858 e–05	1.161 e–05	7.384 e–06	4.460 e–06	2.754 e–06	1.836 e–06
1	145			2.185 e–05	1.373 e–05	8.140 e–06	4.634 e–06	2.587 e–06	1.451 e–06
1	146			7.961 e–07	4.468 e–07	2.360 e–07	1.212 e–07	6.382 e–08	3.638 e–08
1	147			5.868 e–05	6.380 e–05	6.783 e–05	7.088 e–05	7.296 e–05	7.425 e–05

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – E ₀ (Ry)					
1	148			8.317e–06	9.748e–06	1.097e–05	1.202e–05	1.295e–05	1.361e–05
1	149			3.949e–07	1.982e–07	9.353e–08	4.392e–08	2.211e–08	1.236e–08
1	150			4.696e–07	2.344e–07	1.100e–07	5.145e–08	2.619e–08	1.510e–08
1	151			4.711e–07	2.640e–07	1.381e–07	7.116e–08	3.875e–08	2.391e–08
1	152			9.073e–07	5.195e–07	2.812e–07	1.488e–07	8.090e–08	4.685e–08
1	153			1.157e–05	1.323e–05	1.471e–05	1.603e–05	1.722e–05	1.807e–05
1	154			2.245e–06	1.401e–06	8.345e–07	4.851e–07	2.829e–07	1.666e–07
1	155			1.412e–06	8.881e–07	5.255e–07	3.140e–07	1.804e–07	1.109e–07
1	156			4.889e–07	3.069e–07	1.836e–07	1.070e–07	6.258e–08	3.682e–08
1	157			5.823e–04	6.983e–04	7.938e–04	8.736e–04	9.420e–04	9.892e–04
1	158			1.829e–07	2.424e–07	4.181e–07	5.013e–07	1.097e–06	1.319e–06
1	159			6.199e–07	7.247e–07	9.184e–07	1.184e–06	1.449e–06	1.620e–06
2	3		9.915e+00	2.439e–02	1.516e–02	9.267e–03	5.547e–03	3.264e–03	1.899e–03
2	4		3.863e–02	9.632e–02	8.924e–02	8.683e–02	8.607e–02	8.593e–02	8.627e–02
2	5			4.112e–03	2.464e–03	1.440e–03	8.251e–04	4.680e–04	2.652e–04
2	6			2.036e–03	1.265e–03	7.489e–04	4.381e–04	2.559e–04	1.499e–04
2	7			9.457e–03	5.938e–03	3.542e–03	2.073e–03	1.205e–03	6.997e–04
2	8	2.677e–01	8.712e+09	8.820e–01	1.035e+00	1.181e+00	1.323e+00	1.458e+00	1.584e+00
2	9			2.829e–04	1.698e–04	9.835e–05	5.626e–05	3.220e–05	1.855e–05
2	10			2.461e–04	1.530e–04	9.046e–05	5.264e–05	3.050e–05	1.768e–05
2	11	2.841e–01	1.638e+10	6.345e–01	7.417e–01	8.452e–01	9.484e–01	1.049e+00	1.144e+00
2	12			6.941e–03	4.339e–03	2.572e–03	1.478e–03	8.375e–04	4.737e–04
2	13			1.141e–02	1.080e–02	1.088e–02	1.138e–02	1.210e–02	1.282e–02
2	14			3.404e–03	2.094e–03	1.232e–03	7.039e–04	3.972e–04	2.237e–04
2	15		5.064e+05	5.754e–02	6.299e–02	6.694e–02	6.984e–02	7.199e–02	7.360e–02
2	16			4.983e–03	3.257e–03	2.017e–03	1.195e–03	6.898e–04	3.944e–04
2	17		2.334e+05	2.203e–02	2.427e–02	2.589e–02	2.709e–02	2.797e–02	2.863e–02
2	18			3.306e–05	2.387e–05	2.003e–05	1.918e–05	1.974e–05	2.083e–05
2	19			2.226e–03	1.462e–03	9.087e–04	5.397e–04	3.121e–04	1.790e–04
2	20		4.835e+05	3.545e–02	3.942e–02	4.234e–02	4.449e–02	4.608e–02	4.725e–02
2	21			1.153e–03	7.583e–04	4.717e–04	2.802e–04	1.621e–04	9.297e–05
2	22			6.738e–05	6.628e–05	6.525e–05	6.449e–05	6.365e–05	6.293e–05
2	23			9.597e–06	5.927e–06	3.526e–06	2.031e–06	1.148e–06	6.585e–07
2	24		6.039e+03	4.664e–04	4.707e–04	4.747e–04	4.799e–04	4.859e–04	4.920e–04
2	25			1.935e–03	1.260e–03	7.774e–04	4.597e–04	2.651e–04	1.515e–04
2	26			4.751e–04	3.102e–04	1.921e–04	1.140e–04	6.590e–05	3.805e–05
2	27			1.143e–05	6.924e–06	3.993e–06	2.230e–06	1.227e–06	6.741e–07
2	28			3.254e–05	3.422e–05	3.610e–05	3.831e–05	4.047e–05	4.238e–05
2	29			7.029e–06	4.400e–06	2.642e–06	1.541e–06	8.850e–07	5.024e–07
2	30			2.384e–05	1.491e–05	9.030e–06	5.353e–06	3.143e–06	1.840e–06
2	31			1.082e–06	6.554e–07	3.996e–07	2.479e–07	1.557e–07	9.875e–08
2	32	1.290e–04	5.145e+07	4.844e–05	5.810e–05	6.882e–05	8.055e–05	9.282e–05	1.057e–04
2	33			6.907e–06	4.261e–06	2.517e–06	1.445e–06	8.182e–07	4.608e–07
2	34			2.730e–05	1.695e–05	1.010e–05	5.853e–06	3.341e–06	1.887e–06
2	35			1.462e–06	8.552e–07	4.946e–07	2.932e–07	1.817e–07	1.188e–07
2	36	6.825e–02	5.598e+10	3.680e–03	5.767e–03	8.605e–03	1.212e–02	1.572e–02	1.966e–02
2	37			3.785e–04	2.244e–04	1.253e–04	6.858e–05	3.698e–05	1.965e–05
2	38			5.330e–02	5.651e–02	5.876e–02	6.020e–02	6.103e–02	6.152e–02
2	39			1.231e–03	7.270e–04	4.254e–04	2.424e–04	1.340e–04	7.306e–05
2	40		2.852e+07	5.746e–03	6.668e–03	7.811e–03	8.869e–03	9.590e–03	1.032e–02
2	41			1.864e–03	1.095e–03	6.467e–04	3.766e–04	2.130e–04	1.193e–04
2	42	3.736e–01	4.124e+11	1.404e–02	2.409e–02	3.679e–02	5.194e–02	6.788e–02	8.499e–02
2	43			1.879e–03	1.128e–03	6.392e–04	3.498e–04	1.868e–04	9.744e–05
2	44			4.931e–03	4.988e–03	5.275e–03	5.440e–03	5.501e–03	5.584e–03
2	45			1.994e–03	1.205e–03	6.872e–04	3.772e–04	2.009e–04	1.046e–04
2	46			3.191e–02	3.426e–02	3.602e–02	3.725e–02	3.807e–02	3.863e–02
2	47			8.538e–04	5.219e–04	3.180e–04	1.889e–04	1.082e–04	5.966e–05
2	48		2.285e+05	2.850e–05	3.273e–05	3.829e–05	4.383e–05	4.755e–05	5.151e–05
2	49			6.649e–05	3.958e–05	2.335e–05	1.341e–05	7.476e–06	4.007e–06
2	50		2.406e+08	4.187e–02	5.249e–02	6.223e–02	7.152e–02	7.888e–02	8.447e–02
2	51			4.309e–03	2.449e–03	1.353e–03	7.428e–04	4.036e–04	2.147e–04
2	52			4.582e–03	4.400e–03	4.536e–03	4.870e–03	5.335e–03	5.804e–03
2	53			3.858e–03	2.191e–03	1.209e–03	6.640e–04	3.598e–04	1.909e–04
2	54	1.887e–02	2.345e+10	9.886e–04	1.110e–03	1.474e–03	2.062e–03	2.725e–03	3.473e–03
2	55	9.404e–02	1.188e+11	2.113e–03	3.734e–03	6.165e–03	9.376e–03	1.281e–02	1.659e–02
2	56			7.922e–04	4.645e–04	2.598e–04	1.434e–04	7.865e–05	4.333e–05
2	57			2.326e–04	1.393e–04	7.854e–05	4.309e–05	2.311e–05	1.215e–05
2	58	2.792e–02	3.586e+10	5.979e–04	1.081e–03	1.792e–03	2.727e–03	3.727e–03	4.837e–03
2	59			1.495e–04	1.552e–04	1.658e–04	1.725e–04	1.757e–04	1.790e–04
2	60			1.754e–04	1.043e–04	5.878e–05	3.234e–05	1.748e–05	9.283e–06
2	61	6.350e–04	8.243e+08	2.769e–05	3.435e–05	4.780e–05	6.748e–05	8.956e–05	1.139e–04
2	62			1.004e–04	5.835e–05	3.259e–05	1.800e–05	9.950e–06	5.549e–06
2	63			2.955e–05	1.790e–05	1.016e–05	5.558e–06	2.955e–06	1.559e–06
2	64		3.611e+07	2.651e–03	2.921e–03	3.349e–03	3.817e–03	4.134e–03	4.524e–03

(continued on next page)

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – Eo (Ry)					
2	65			6.321e-04	3.669e-04	2.120e-04	1.193e-04	6.570e-05	3.580e-05
2	66		1.443e+08	7.852e-03	1.046e-02	1.308e-02	1.557e-02	1.725e-02	1.900e-02
2	67			1.565e-03	9.299e-04	5.462e-04	3.110e-04	1.729e-04	9.493e-05
2	68		4.131e+06	1.998e-04	2.558e-04	3.183e-04	3.753e-04	4.127e-04	4.594e-04
2	69			1.138e-04	7.030e-05	4.212e-05	2.440e-05	1.378e-05	7.684e-06
2	70			2.824e-05	2.260e-05	2.079e-05	2.127e-05	2.261e-05	2.480e-05
2	71			4.560e-05	2.804e-05	1.653e-05	9.492e-06	5.373e-06	2.991e-06
2	72		1.053e+07	6.419e-04	7.924e-04	9.560e-04	1.121e-03	1.234e-03	1.352e-03
2	73			9.188e-05	5.317e-05	3.059e-05	1.721e-05	9.536e-06	5.238e-06
2	74			3.660e-05	3.835e-05	3.965e-05	4.057e-05	4.116e-05	4.154e-05
2	75			2.217e-05	1.296e-05	7.519e-06	4.277e-06	2.398e-06	1.325e-06
2	76			1.052e-02	1.123e-02	1.206e-02	1.273e-02	1.314e-02	1.343e-02
2	77			1.414e-02	1.642e-02	1.851e-02	2.006e-02	2.100e-02	2.161e-02
2	78			4.106e-03	2.462e-03	1.408e-03	7.749e-04	4.162e-04	2.204e-04
2	79			1.893e-03	1.139e-03	6.531e-04	3.602e-04	1.939e-04	1.031e-04
2	80			1.812e-04	1.392e-04	1.137e-04	1.007e-04	9.373e-05	9.045e-05
2	81			1.924e-05	1.444e-05	1.299e-05	1.339e-05	1.429e-05	1.482e-05
2	82			6.846e-06	3.495e-06	1.708e-06	8.181e-07	4.048e-07	2.186e-07
2	83			1.217e-03	1.309e-03	1.412e-03	1.499e-03	1.554e-03	1.590e-03
2	84			2.126e-04	1.277e-04	7.317e-05	4.034e-05	2.166e-05	1.147e-05
2	85	5.881e-04	9.391e+08	7.246e-05	9.140e-05	1.136e-04	1.362e-04	1.610e-04	1.871e-04
2	86			6.920e-04	4.125e-04	2.344e-04	1.284e-04	6.860e-05	3.607e-05
2	87			2.796e-04	1.676e-04	9.580e-05	5.263e-05	2.816e-05	1.486e-05
2	88	3.327e-04	5.442e+08	4.122e-06	7.084e-06	1.243e-05	2.029e-05	2.912e-05	3.950e-05
2	89			8.432e-06	4.968e-06	2.774e-06	1.493e-06	7.857e-07	4.071e-07
2	90			9.280e-05	1.032e-04	1.141e-04	1.218e-04	1.264e-04	1.298e-04
2	91			6.435e-06	3.691e-06	2.028e-06	1.098e-06	5.920e-07	3.151e-07
2	92			1.576e-06	1.208e-06	1.036e-06	1.000e-06	1.008e-06	1.013e-06
2	93			5.497e-06	3.269e-06	1.931e-06	1.114e-06	6.337e-07	3.534e-07
2	94			1.109e-05	1.484e-05	1.881e-05	2.289e-05	2.564e-05	2.840e-05
2	95			2.216e-06	1.313e-06	7.607e-07	4.224e-07	2.254e-07	1.160e-07
2	96			6.842e-06	8.092e-06	9.726e-06	1.137e-05	1.241e-05	1.414e-05
2	97			3.748e-06	2.309e-06	1.407e-06	8.523e-07	5.228e-07	3.239e-07
2	98			7.115e-07	6.128e-07	6.069e-07	6.493e-07	7.039e-07	7.830e-07
2	99	1.165e-02	2.113e+10	6.471e-04	8.047e-04	1.079e-03	1.447e-03	1.897e-03	2.292e-03
2	100			2.212e-06	1.324e-06	7.812e-07	4.524e-07	2.571e-07	1.380e-07
2	101			9.638e-07	9.552e-07	9.921e-07	1.033e-06	1.117e-06	1.186e-06
2	102			1.941e-06	1.944e-06	1.958e-06	1.980e-06	1.988e-06	1.978e-06
2	103			1.372e-04	8.070e-05	4.460e-05	2.446e-05	1.343e-05	7.264e-06
2	104			2.016e-05	1.277e-05	7.800e-06	4.601e-06	2.679e-06	1.545e-06
2	105			4.977e-05	2.960e-05	1.741e-05	1.000e-05	5.539e-06	2.958e-06
2	106			8.723e-03	9.263e-03	9.673e-03	9.970e-03	1.016e-02	1.026e-02
2	107			5.502e-04	3.244e-04	1.912e-04	1.114e-04	6.323e-05	3.496e-05
2	108			1.270e-03	1.289e-03	1.374e-03	1.543e-03	1.710e-03	1.759e-03
2	109			4.979e-04	2.937e-04	1.729e-04	1.009e-04	5.737e-05	3.196e-05
2	110			4.277e-06	2.642e-06	1.594e-06	9.538e-07	6.832e-07	6.506e-07
2	111	5.082e-03	1.011e+10	2.056e-04	3.136e-04	4.495e-04	6.018e-04	7.747e-04	9.419e-04
2	112			6.359e-05	3.780e-05	2.130e-05	1.153e-05	6.104e-06	3.194e-06
2	113			1.908e-04	2.156e-04	2.418e-04	2.643e-04	2.769e-04	2.793e-04
2	114			5.340e-05	3.226e-05	1.948e-05	1.233e-05	1.061e-05	1.198e-05
2	115			2.636e-05	1.490e-05	8.060e-06	4.320e-06	2.295e-06	1.210e-06
2	116	2.357e-03	4.716e+09	9.653e-05	1.452e-04	2.069e-04	2.762e-04	3.550e-04	4.315e-04
2	117			1.565e-05	1.303e-05	1.256e-05	1.367e-05	1.463e-05	1.487e-05
2	118			6.340e-04	3.728e-04	2.102e-04	1.150e-04	6.236e-05	3.350e-05
2	119	8.883e-02	1.785e+11	3.579e-03	5.433e-03	7.767e-03	1.037e-02	1.335e-02	1.621e-02
2	120			8.025e-04	4.912e-04	2.825e-04	1.567e-04	8.438e-05	4.486e-05
2	121			1.238e-03	1.079e-03	1.018e-03	1.038e-03	1.058e-03	1.035e-03
2	122			2.154e-06	2.361e-06	2.862e-06	3.490e-06	4.385e-06	5.089e-06
2	123			4.967e-06	3.103e-06	1.840e-06	1.062e-06	5.988e-07	3.345e-07
2	124			2.682e-06	2.731e-06	2.817e-06	2.968e-06	3.174e-06	3.339e-06
2	125			1.680e-06	1.042e-06	6.157e-07	3.552e-07	2.005e-07	1.127e-07
2	126			2.283e-07	1.357e-07	8.143e-08	5.043e-08	3.258e-08	2.172e-08
2	127			2.328e-04	1.242e-04	6.308e-05	3.153e-05	1.584e-05	7.915e-06
2	128			2.816e-05	1.721e-05	1.002e-05	5.690e-06	3.180e-06	1.767e-06
2	129	6.419e-05	1.321e+08	4.779e-06	5.760e-06	7.126e-06	8.613e-06	1.046e-05	1.226e-05
2	130		4.704e+07	7.349e-03	8.751e-03	1.017e-02	1.144e-02	1.263e-02	1.358e-02
2	131			1.481e-03	8.873e-04	5.109e-04	2.864e-04	1.600e-04	8.896e-05
2	132			4.321e-05	2.629e-05	1.517e-05	8.520e-06	4.697e-06	2.562e-06
2	133			1.133e-03	9.083e-04	8.565e-04	9.007e-04	9.778e-04	1.066e-03
2	134			1.372e-03	8.226e-04	4.732e-04	2.650e-04	1.481e-04	8.214e-05
2	135			2.705e-03	3.366e-03	4.073e-03	4.438e-03	4.674e-03	4.921e-03
2	136			9.148e-04	4.776e-04	2.380e-04	1.169e-04	5.820e-05	2.864e-05
2	137			8.550e-04	7.027e-04	6.677e-04	7.222e-04	7.752e-04	7.887e-04
2	138			5.770e-06	4.465e-06	3.735e-06	3.373e-06	3.289e-06	3.397e-06

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – E ₀ (Ry)					
2	139			6.170e–04	3.224e–04	1.603e–04	7.818e–05	3.869e–05	1.907e–05
2	140			3.447e–06	4.688e–06	5.835e–06	6.771e–06	7.695e–06	8.660e–06
2	141			3.629e–06	2.159e–06	1.246e–06	7.097e–07	3.964e–07	2.091e–07
2	142			2.742e–08	2.436e–08	2.468e–08	2.500e–08	2.589e–08	2.867e–08
2	143		1.213e+06	1.272e–04	1.547e–04	1.819e–04	2.062e–04	2.303e–04	2.481e–04
2	144			2.376e–05	1.449e–05	8.445e–06	4.830e–06	2.718e–06	1.499e–06
2	145			1.461e–05	1.328e–05	1.361e–05	1.477e–05	1.617e–05	1.781e–05
2	146			3.107e–06	3.489e–06	3.940e–06	4.377e–06	4.864e–06	5.208e–06
2	147			1.283e–06	7.480e–07	4.145e–07	2.299e–07	1.301e–07	7.180e–08
2	148			4.554e–06	2.735e–06	1.576e–06	8.957e–07	5.066e–07	2.811e–07
2	149			2.173e–06	2.478e–06	2.797e–06	3.067e–06	3.416e–06	3.803e–06
2	150			1.086e–06	6.620e–07	3.904e–07	2.257e–07	1.275e–07	6.857e–08
2	151			9.617e–07	5.784e–07	3.263e–07	1.849e–07	1.002e–07	5.256e–08
2	152		2.157e+05	9.375e–06	1.206e–05	1.460e–05	1.733e–05	1.994e–05	2.118e–05
2	153			3.749e–06	2.257e–06	1.292e–06	7.321e–07	4.062e–07	2.210e–07
2	154			3.385e–06	3.755e–06	4.201e–06	4.687e–06	5.323e–06	5.548e–06
2	155			4.599e–07	2.613e–07	1.449e–07	8.199e–08	4.580e–08	2.485e–08
2	156			1.970e–06	2.010e–06	2.032e–06	2.052e–06	2.067e–06	2.029e–06
2	157			1.045e–04	6.282e–05	3.620e–05	2.045e–05	1.146e–05	6.315e–06
2	158			5.041e–07	3.139e–07	1.844e–07	1.111e–07	6.368e–08	3.645e–08
2	159			3.188e–06	1.954e–06	1.159e–06	6.749e–07	3.845e–07	2.085e–07
3	4		1.210e+02	2.455e–01	2.174e–01	2.048e–01	1.986e–01	1.956e–01	1.947e–01
3	5			1.625e–02	1.135e–02	8.317e–03	6.514e–03	5.761e–03	4.895e–03
3	6	2.477e–01	2.127e+10	8.923e–01	1.048e+00	1.196e+00	1.339e+00	1.474e+00	1.599e+00
3	7	9.327e–02	1.683e+09	3.474e–01	3.949e–01	4.427e–01	4.909e–01	5.379e–01	5.824e–01
3	8	1.948e–01	6.071e+09	6.686e–01	7.809e–01	8.891e–01	9.942e–01	1.094e+00	1.188e+00
3	9	2.545e–01	5.417e+09	7.937e–01	9.293e–01	1.059e+00	1.186e+00	1.307e+00	1.421e+00
3	10	3.446e–03	5.499e+08	9.183e–03	1.013e–02	1.118e–02	1.232e–02	1.350e–02	1.465e–02
3	11	2.064e–01	1.152e+10	4.801e–01	5.566e–01	6.313e–01	7.065e–01	7.800e–01	8.503e–01
3	12	6.269e–01	2.113e+10	1.438e+00	1.678e+00	1.910e+00	2.142e+00	2.367e+00	2.582e+00
3	13			3.312e–02	2.798e–02	2.546e–02	2.479e–02	2.524e–02	2.611e–02
3	14	1.397e–02	6.733e+08	3.475e–02	3.502e–02	3.651e–02	3.903e–02	4.215e–02	4.554e–02
3	15		5.183e+05	6.957e–02	7.291e–02	7.536e–02	7.728e–02	7.884e–02	8.015e–02
3	16		9.539e+05	1.433e–01	1.579e–01	1.685e–01	1.763e–01	1.820e–01	1.863e–01
3	17			6.105e–03	4.030e–03	2.531e–03	1.533e–03	9.190e–04	5.598e–04
3	18			4.196e–03	2.743e–03	1.707e–03	1.024e–03	6.073e–04	3.649e–04
3	19		1.242e+06	5.880e–02	6.498e–02	6.952e–02	7.286e–02	7.534e–02	7.718e–02
3	20		6.466e+05	5.310e–02	5.756e–02	6.084e–02	6.331e–02	6.519e–02	6.663e–02
3	21		2.691e+05	2.877e–02	3.085e–02	3.238e–02	3.355e–02	3.447e–02	3.518e–02
3	22			3.767e–04	2.457e–04	1.520e–04	8.999e–05	5.192e–05	2.977e–05
3	23			1.286e–03	9.114e–04	6.422e–04	4.653e–04	3.561e–04	2.927e–04
3	24		5.757e+04	5.646e–03	5.575e–03	5.531e–03	5.528e–03	5.557e–03	5.603e–03
3	25			6.631e–03	4.358e–03	2.731e–03	1.662e–03	1.006e–03	6.239e–04
3	26			1.765e–03	1.163e–03	7.298e–04	4.464e–04	2.709e–04	1.700e–04
3	27			6.411e–05	5.914e–05	5.703e–05	5.728e–05	5.872e–05	6.054e–05
3	28			3.375e–05	2.243e–05	1.518e–05	1.095e–05	8.662e–06	7.503e–06
3	29			5.924e–05	5.837e–05	5.891e–05	6.075e–05	6.313e–05	6.550e–05
3	30	1.765e–04	4.155e+07	1.399e–04	1.275e–04	1.254e–04	1.309e–04	1.414e–04	1.554e–04
3	31	9.491e–05	1.120e+08	3.589e–05	4.257e–05	5.018e–05	5.870e–05	6.770e–05	7.719e–05
3	32	8.967e–05	3.533e+07	4.003e–05	4.450e–05	5.059e–05	5.795e–05	6.604e–05	7.475e–05
3	33	4.997e–05	1.186e+07	3.995e–05	3.532e–05	3.401e–05	3.520e–05	3.802e–05	4.195e–05
3	34			9.711e–05	6.728e–05	4.791e–05	3.634e–05	2.993e–05	2.658e–05
3	35	9.110e–06	1.244e+07	6.548e–06	5.281e–06	4.837e–06	4.985e–06	5.402e–06	6.014e–06
3	36	2.066e–01	1.680e+11	1.126e–02	1.768e–02	2.637e–02	3.708e–02	4.808e–02	6.008e–02
3	37	1.042e–03	2.617e+09	1.166e–03	7.467e–04	4.948e–04	3.830e–04	3.421e–04	3.516e–04
3	38			1.545e–03	9.050e–04	5.315e–04	3.069e–04	1.720e–04	9.526e–05
3	39		2.085e+07	1.282e–01	1.354e–01	1.407e–01	1.443e–01	1.464e–01	1.478e–01
3	40		6.311e+07	1.511e–02	1.631e–02	1.838e–02	2.046e–02	2.190e–02	2.345e–02
3	41		1.509e+07	4.151e–02	4.250e–02	4.356e–02	4.438e–02	4.490e–02	4.534e–02
3	42	2.812e–01	3.082e+11	1.354e–02	2.011e–02	2.906e–02	4.013e–02	5.198e–02	6.481e–02
3	43	8.231e–01	5.417e+11	3.660e–02	5.878e–02	8.711e–02	1.208e–01	1.561e–01	1.940e–01
3	44			1.272e–02	1.172e–02	1.154e–02	1.142e–02	1.128e–02	1.131e–02
3	45	8.710e–03	5.752e+09	6.241e–03	4.279e–03	3.171e–03	2.695e–03	2.591e–03	2.734e–03
3	46			7.800e–04	4.768e–04	2.906e–04	1.727e–04	9.892e–05	5.471e–05
3	47		2.836e+05	9.227e–02	9.847e–02	1.032e–01	1.064e–01	1.086e–01	1.100e–01
3	48		4.948e+05	6.409e–04	4.259e–04	3.001e–04	2.249e–04	1.786e–04	1.545e–04
3	49			5.559e–03	5.807e–03	6.016e–03	6.171e–03	6.278e–03	6.352e–03
3	50		2.350e+08	4.753e–02	5.557e–02	6.376e–02	7.214e–02	7.898e–02	8.427e–02
3	51		3.368e+08	8.917e–02	1.099e–01	1.293e–01	1.481e–01	1.632e–01	1.748e–01
3	52			1.546e–02	1.214e–02	1.063e–02	1.028e–02	1.061e–02	1.118e–02
3	53		3.086e+06	1.233e–02	7.647e–03	4.980e–03	3.565e–03	2.830e–03	2.461e–03
3	54	5.374e–02	6.634e+10	2.445e–03	2.937e–03	4.067e–03	5.788e–03	7.705e–03	9.864e–03
3	55	6.494e–03	8.149e+09	1.500e–03	1.084e–03	9.129e–04	9.362e–04	1.063e–03	1.265e–03
3	56	1.795e–01	1.353e+11	5.285e–03	7.996e–03	1.244e–02	1.848e–02	2.500e–02	3.222e–02

(continued on next page)

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – Eo (Ry)					
3	57	6.953e–02	2.631e+11	1.632e–03	2.841e–03	4.635e–03	7.009e–03	9.548e–03	1.236e–02
3	58	7.834e–02	9.993e+10	1.850e–03	3.147e–03	5.121e–03	7.752e–03	1.058e–02	1.370e–02
3	59			7.835e–04	5.895e–04	4.835e–04	4.247e–04	3.914e–04	3.762e–04
3	60	2.675e–02	2.064e+10	1.188e–03	1.395e–03	1.907e–03	2.703e–03	3.599e–03	4.632e–03
3	61	1.875e–02	2.417e+10	5.863e–04	8.415e–04	1.276e–03	1.881e–03	2.541e–03	3.275e–03
3	62	7.489e–03	5.886e+09	6.958e–04	5.987e–04	6.479e–04	8.187e–04	1.042e–03	1.311e–03
3	63	1.086e–03	4.392e+09	1.578e–04	1.216e–04	1.118e–04	1.257e–04	1.510e–04	1.857e–04
3	64		7.167e+07	5.885e–03	6.289e–03	7.069e–03	7.971e–03	8.596e–03	9.366e–03
3	65		1.928e+08	7.246e–03	9.141e–03	1.115e–02	1.312e–02	1.447e–02	1.588e–02
3	66		2.614e+07	3.989e–03	3.503e–03	3.423e–03	3.555e–03	3.686e–03	3.902e–03
3	67		1.612e+08	1.398e–02	1.726e–02	2.090e–02	2.448e–02	2.690e–02	2.955e–02
3	68		4.420e+07	2.392e–03	3.046e–03	3.751e–03	4.433e–03	4.886e–03	5.390e–03
3	69		1.490e+06	8.724e–04	5.974e–04	4.474e–04	3.641e–04	3.190e–04	3.091e–04
3	70			8.649e–04	5.319e–04	3.288e–04	2.058e–04	1.350e–04	9.745e–05
3	71		2.561e+07	2.052e–03	2.482e–03	2.985e–03	3.484e–03	3.815e–03	4.203e–03
3	72		5.496e+07	3.272e–03	4.091e–03	4.969e–03	5.843e–03	6.441e–03	7.064e–03
3	73		3.979e+06	6.316e–04	4.988e–04	4.390e–04	4.189e–04	4.115e–04	4.198e–04
3	74			9.453e–05	5.481e–05	3.158e–05	1.777e–05	9.832e–06	5.388e–06
3	75		2.003e+07	8.794e–04	9.943e–04	1.148e–03	1.316e–03	1.432e–03	1.559e–03
3	76			1.658e–02	1.591e–02	1.594e–02	1.616e–02	1.633e–02	1.650e–02
3	77			8.101e–03	5.781e–03	4.353e–03	3.532e–03	3.074e–03	2.835e–03
3	78			3.432e–02	3.805e–02	4.184e–02	4.474e–02	4.650e–02	4.769e–02
3	79	2.378e–04	2.198e+08	1.601e–02	1.768e–02	1.939e–02	2.072e–02	2.154e–02	2.210e–02
3	80			7.138e–03	8.283e–03	9.344e–03	1.013e–02	1.060e–02	1.091e–02
3	81			2.312e–03	1.389e–03	8.011e–04	4.516e–04	2.550e–04	1.477e–04
3	82			1.591e–03	9.712e–04	5.620e–04	3.178e–04	1.780e–04	1.025e–04
3	83			5.793e–03	6.204e–03	6.676e–03	7.076e–03	7.324e–03	7.493e–03
3	84	1.343e–03	1.275e+09	2.194e–03	1.995e–03	1.936e–03	1.946e–03	1.984e–03	2.040e–03
3	85	4.497e–04	7.138e+08	5.771e–04	3.839e–04	2.672e–04	2.039e–04	1.769e–04	1.718e–04
3	86			3.733e–03	2.664e–03	2.007e–03	1.632e–03	1.421e–03	1.312e–03
3	87			1.668e–03	1.230e–03	9.554e–04	8.014e–04	7.145e–04	6.710e–04
3	88	2.767e–04	4.498e+08	3.222e–05	2.321e–05	2.029e–05	2.245e–05	2.735e–05	3.469e–05
3	89	6.786e–04	6.625e+08	1.708e–04	1.924e–04	2.204e–04	2.491e–04	2.744e–04	3.011e–04
3	90			2.473e–04	2.680e–04	2.918e–04	3.094e–04	3.199e–04	3.277e–04
3	91			3.142e–05	2.130e–05	1.527e–05	1.216e–05	1.040e–05	9.470e–06
3	92			4.002e–06	2.425e–06	1.492e–06	9.726e–07	6.657e–07	4.986e–07
3	93		1.370e+06	3.234e–05	3.722e–05	4.395e–05	5.139e–05	5.639e–05	6.260e–05
3	94		9.900e+04	8.756e–06	7.042e–06	6.429e–06	6.340e–06	6.290e–06	6.857e–06
3	95		3.221e+05	2.086e–05	2.379e–05	2.775e–05	3.245e–05	3.588e–05	3.900e–05
3	96		7.146e+04	1.024e–05	7.862e–06	6.793e–06	6.547e–06	6.507e–06	6.625e–06
3	97		2.836e+05	1.869e–05	1.944e–05	2.160e–05	2.425e–05	2.598e–05	2.912e–05
3	98			3.050e–06	2.205e–06	1.759e–06	1.580e–06	1.532e–06	1.587e–06
3	99	3.486e–02	6.285e+10	1.956e–03	2.440e–03	3.273e–03	4.388e–03	5.746e–03	6.938e–03
3	100			8.614e–06	6.695e–06	5.673e–06	5.182e–06	5.017e–06	5.019e–06
3	101			2.728e–06	2.066e–06	1.728e–06	1.513e–06	1.431e–06	1.494e–06
3	102			7.897e–07	4.549e–07	2.542e–07	1.414e–07	8.068e–08	4.289e–08
3	103	4.011e–04	2.187e+09	4.171e–04	2.576e–04	1.616e–04	1.148e–04	9.685e–05	9.073e–05
3	104			6.546e–05	4.225e–05	2.698e–05	1.722e–05	1.141e–05	8.102e–06
3	105		7.564e+04	2.429e–04	1.868e–04	1.541e–04	1.348e–04	1.233e–04	1.164e–04
3	106			5.625e–04	3.307e–04	1.947e–04	1.135e–04	6.437e–05	3.554e–05
3	107		1.427e+07	2.722e–02	2.865e–02	2.981e–02	3.073e–02	3.135e–02	3.165e–02
3	108		2.901e+07	3.638e–03	3.358e–03	3.360e–03	3.627e–03	3.933e–03	4.002e–03
3	109		2.714e+06	1.625e–03	1.092e–03	7.873e–04	6.179e–04	5.219e–04	4.610e–04
3	110			2.067e–05	1.928e–05	1.893e–05	1.912e–05	1.930e–05	1.925e–05
3	111	3.627e–03	7.175e+09	2.171e–04	2.693e–04	3.512e–04	4.514e–04	5.705e–04	6.881e–04
3	112	1.524e–02	1.811e+10	7.725e–04	1.082e–03	1.485e–03	1.947e–03	2.469e–03	2.970e–03
3	113			1.946e–04	1.210e–04	7.542e–05	5.154e–05	4.190e–05	3.674e–05
3	114			3.665e–04	3.695e–04	3.869e–04	4.085e–04	4.207e–04	4.212e–04
3	115			1.927e–04	2.201e–04	2.499e–04	2.697e–04	2.828e–04	2.937e–04
3	116	2.276e–03	4.529e+09	1.190e–04	1.560e–04	2.097e–04	2.734e–04	3.486e–04	4.214e–04
3	117			7.062e–05	4.692e–05	3.508e–05	3.117e–05	2.974e–05	2.852e–05
3	118	1.366e–01	1.639e+11	6.961e–03	9.367e–03	1.270e–02	1.659e–02	2.110e–02	2.547e–02
3	119	6.596e–02	1.318e+11	3.696e–03	4.697e–03	6.196e–03	7.996e–03	1.013e–02	1.223e–02
3	120	6.647e–02	7.976e+10	4.871e–03	5.685e–03	7.090e–03	8.882e–03	1.103e–02	1.312e–02
3	121			3.533e–03	2.793e–03	2.394e–03	2.266e–03	2.210e–03	2.110e–03
3	122	1.500e–04	3.014e+08	9.775e–06	1.289e–05	1.730e–05	2.227e–05	2.847e–05	3.362e–05
3	123			1.919e–05	1.523e–05	1.283e–05	1.168e–05	1.129e–05	1.117e–05
3	124			5.492e–06	4.095e–06	3.189e–06	2.669e–06	2.380e–06	2.218e–06
3	125			6.249e–06	4.784e–06	3.902e–06	3.451e–06	3.338e–06	3.387e–06
3	126	7.766e–05	4.767e+08	5.386e–06	6.543e–06	8.177e–06	9.982e–06	1.222e–05	1.439e–05
3	127			7.480e–04	4.287e–04	2.552e–04	1.685e–04	1.260e–04	1.057e–04
3	128			8.581e–05	5.334e–05	3.218e–05	1.928e–05	1.202e–05	7.978e–06
3	129	5.761e–05	1.180e+08	5.125e–06	5.653e–06	6.680e–06	7.918e–06	9.525e–06	1.112e–05
3	130		4.534e+07	9.327e–03	9.896e–03	1.078e–02	1.172e–02	1.273e–02	1.357e–02

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – E ₀ (Ry)					
3	131		6.554e+07	1.611e–02	1.861e–02	2.133e–02	2.388e–02	2.632e–02	2.832e–02
3	132	1.739e–04	2.142e+08	1.364e–04	8.968e–05	6.117e–05	4.601e–05	4.020e–05	3.913e–05
3	133			4.478e–03	3.105e–03	2.409e–03	2.131e–03	2.073e–03	2.125e–03
3	134		7.771e+05	4.201e–03	2.607e–03	1.615e–03	1.040e–03	7.233e–04	5.532e–04
3	135			4.287e–03	4.434e–03	4.896e–03	5.137e–03	5.319e–03	5.554e–03
3	136			6.117e–03	7.147e–03	8.401e–03	9.125e–03	9.621e–03	1.009e–02
3	137			3.015e–03	2.029e–03	1.583e–03	1.488e–03	1.488e–03	1.465e–03
3	138			1.535e–05	1.280e–05	1.182e–05	1.168e–05	1.211e–05	1.300e–05
3	139			1.945e–03	1.080e–03	6.191e–04	3.952e–04	2.893e–04	2.390e–04
3	140			8.828e–06	6.089e–06	4.441e–06	3.524e–06	3.113e–06	2.994e–06
3	141			1.406e–05	1.493e–05	1.621e–05	1.748e–05	1.915e–05	2.113e–05
3	142			2.128e–06	1.283e–06	7.604e–07	4.533e–07	2.746e–07	1.713e–07
3	143		1.259e+06	1.668e–04	1.823e–04	2.022e–04	2.224e–04	2.445e–04	2.614e–04
3	144		1.637e+06	2.652e–04	3.150e–04	3.664e–04	4.139e–04	4.614e–04	4.972e–04
3	145			5.787e–05	4.326e–05	3.596e–05	3.333e–05	3.313e–05	3.453e–05
3	146			3.902e–06	2.600e–06	1.774e–06	1.373e–06	1.172e–06	1.023e–06
3	147			4.435e–06	2.901e–06	2.000e–06	1.567e–06	1.405e–06	1.378e–06
3	148			1.348e–05	9.843e–06	7.726e–06	6.602e–06	6.249e–06	6.310e–06
3	149			5.011e–06	2.969e–06	1.746e–06	1.072e–06	7.175e–07	5.394e–07
3	150			5.141e–06	5.168e–06	5.388e–06	5.658e–06	6.115e–06	6.696e–06
3	151		5.055e+05	1.449e–05	1.797e–05	2.141e–05	2.508e–05	2.864e–05	3.049e–05
3	152			1.239e–05	1.292e–05	1.393e–05	1.546e–05	1.725e–05	1.808e–05
3	153			1.477e–05	1.213e–05	1.094e–05	1.101e–05	1.157e–05	1.170e–05
3	154			1.198e–05	1.341e–05	1.507e–05	1.701e–05	1.932e–05	2.014e–05
3	155			8.314e–06	8.656e–06	9.038e–06	9.514e–06	1.011e–05	1.019e–05
3	156			4.095e–07	2.329e–07	1.295e–07	7.384e–08	4.204e–08	2.363e–08
3	157			3.254e–04	2.026e–04	1.261e–04	8.162e–05	5.694e–05	4.341e–05
3	158			2.687e–06	2.511e–06	2.568e–06	2.757e–06	3.000e–06	3.217e–06
3	159			1.084e–05	7.344e–06	5.180e–06	3.939e–06	3.265e–06	2.983e–06
4	5			2.427e–02	1.553e–02	1.001e–02	6.651e–03	4.690e–03	3.585e–03
4	6			1.139e–03	7.052e–04	4.174e–04	2.448e–04	1.436e–04	8.453e–05
4	7	1.698e–01	2.727e+09	6.662e–01	7.687e–01	8.692e–01	9.676e–01	1.062e+00	1.150e+00
4	8	3.053e–01	8.483e+09	1.126e+00	1.321e+00	1.507e+00	1.686e+00	1.855e+00	2.012e+00
4	9	8.039e–01	1.537e+10	2.713e+00	3.170e+00	3.610e+00	4.038e+00	4.446e+00	4.826e+00
4	10			4.070e–03	2.530e–03	1.500e–03	8.768e–04	5.109e–04	2.978e–04
4	11	1.318e–02	6.759e+08	5.539e–02	5.862e–02	6.324e–02	6.887e–02	7.490e–02	8.079e–02
4	12	2.014e–01	6.238e+09	5.195e–01	5.965e–01	6.731e–01	7.511e–01	8.276e–01	9.007e–01
4	13	1.132e+00	2.530e+10	2.738e+00	3.190e+00	3.628e+00	4.066e+00	4.490e+00	4.893e+00
4	14	7.819e–04	3.511e+07	1.817e–02	1.194e–02	7.929e–03	5.571e–03	4.302e–03	3.682e–03
4	15		2.959e+04	4.359e–03	4.634e–03	4.842e–03	5.004e–03	5.130e–03	5.231e–03
4	16		2.523e+05	4.935e–02	5.167e–02	5.338e–02	5.473e–02	5.583e–02	5.675e–02
4	17		1.564e+04	9.775e–03	7.229e–03	5.382e–03	4.168e–03	3.429e–03	3.007e–03
4	18		1.230e+06	2.500e–01	2.723e–01	2.886e–01	3.006e–01	3.095e–01	3.163e–01
4	19			1.683e–03	1.106e–03	6.892e–04	4.118e–04	2.408e–04	1.407e–04
4	20		2.130e+04	7.021e–03	5.450e–03	4.311e–03	3.566e–03	3.116e–03	2.864e–03
4	21		9.771e+05	1.133e–01	1.234e–01	1.309e–01	1.364e–01	1.405e–01	1.437e–01
4	22		1.246e+06	2.067e–02	2.258e–02	2.398e–02	2.503e–02	2.582e–02	2.642e–02
4	23		1.242e+06	6.146e–02	6.710e–02	7.126e–02	7.437e–02	7.670e–02	7.848e–02
4	24		1.171e+06	9.638e–02	1.050e–01	1.113e–01	1.160e–01	1.196e–01	1.223e–01
4	25			1.520e–02	1.002e–02	6.301e–03	3.859e–03	2.357e–03	1.482e–03
4	26			4.667e–03	3.058e–03	1.900e–03	1.133e–03	6.586e–04	3.833e–04
4	27			3.478e–05	3.135e–05	2.963e–05	2.930e–05	2.973e–05	3.047e–05
4	28			8.454e–05	7.898e–05	7.687e–05	7.766e–05	7.990e–05	8.256e–05
4	29			1.248e–04	1.114e–04	1.047e–04	1.035e–04	1.052e–04	1.080e–04
4	30	5.756e–05	1.312e+07	1.349e–04	9.651e–05	7.303e–05	6.071e–05	5.579e–05	5.560e–05
4	31			2.071e–06	1.223e–06	7.051e–07	4.051e–07	2.344e–07	1.378e–07
4	32	9.174e–05	3.502e+07	4.042e–05	4.488e–05	5.110e–05	5.878e–05	6.726e–05	7.642e–05
4	33	3.371e–04	7.754e+07	1.840e–04	1.907e–04	2.070e–04	2.306e–04	2.589e–04	2.907e–04
4	34			1.489e–04	9.275e–05	5.552e–05	3.230e–05	1.860e–05	1.070e–05
4	35			8.715e–06	5.091e–06	2.962e–06	1.773e–06	1.107e–06	7.239e–07
4	36	3.641e–01	2.896e+11	2.026e–02	3.210e–02	4.787e–02	6.718e–02	8.695e–02	1.085e–01
4	37			1.873e–03	1.107e–03	6.172e–04	3.376e–04	1.819e–04	9.635e–05
4	38		1.401e+08	6.301e–03	7.343e–03	8.598e–03	9.757e–03	1.055e–02	1.133e–02
4	39		7.621e+07	1.445e–02	1.440e–02	1.544e–02	1.672e–02	1.764e–02	1.871e–02
4	40		4.881e+07	2.832e–01	2.987e–01	3.108e–01	3.192e–01	3.243e–01	3.280e–01
4	41		2.871e+07	8.573e–03	7.210e–03	6.762e–03	6.714e–03	6.745e–03	6.974e–03
4	42	1.922e–02	2.067e+10	1.076e–02	1.108e–02	1.206e–02	1.302e–02	1.390e–02	1.490e–02
4	43	2.769e–01	1.788e+11	2.512e–02	3.143e–02	4.066e–02	5.185e–02	6.370e–02	7.661e–02
4	44	1.563e+00	7.225e+11	7.433e–02	1.157e–01	1.692e–01	2.333e–01	3.009e–01	3.736e–01
4	45	8.129e–03	5.269e+09	9.359e–03	6.046e–03	4.081e–03	3.098e–03	2.711e–03	2.682e–03
4	46		1.106e+06	3.284e–05	3.751e–05	4.363e–05	4.977e–05	5.388e–05	5.814e–05
4	47		7.611e+05	3.603e–04	2.537e–04	1.955e–04	1.635e–04	1.444e–04	1.369e–04
4	48		3.470e+05	1.643e–01	1.751e–01	1.833e–01	1.890e–01	1.928e–01	1.953e–01
4	49		6.324e+04	2.040e–03	1.247e–03	7.610e–04	4.545e–04	2.640e–04	1.498e–04

(continued on next page)

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – E ₀ (Ry)					
4	50		3.285e+07	1.927e–02	1.908e–02	2.000e–02	2.163e–02	2.348e–02	2.517e–02
4	51		1.643e+08	5.987e–02	6.673e–02	7.473e–02	8.359e–02	9.126e–02	9.742e–02
4	52		4.936e+08	1.801e–01	2.169e–01	2.524e–01	2.875e–01	3.157e–01	3.374e–01
4	53			1.928e–02	1.095e–02	6.061e–03	3.322e–03	1.810e–03	9.666e–04
4	54	7.297e–05	8.848e+07	3.973e–04	3.445e–04	3.217e–04	3.096e–04	3.036e–04	3.039e–04
4	55	7.164e–04	8.832e+08	5.143e–04	3.822e–04	3.150e–04	2.921e–04	2.918e–04	3.073e–04
4	56	7.064e–03	5.233e+09	1.126e–03	1.023e–03	1.086e–03	1.268e–03	1.497e–03	1.768e–03
4	57			9.965e–05	5.911e–05	3.326e–05	1.834e–05	9.938e–06	5.259e–06
4	58	4.186e–02	5.246e+10	2.220e–03	2.485e–03	3.264e–03	4.533e–03	5.973e–03	7.623e–03
4	59	2.639e–01	1.423e+11	8.661e–03	1.227e–02	1.856e–02	2.730e–02	3.681e–02	4.735e–02
4	60	2.709e–01	2.054e+11	7.058e–03	1.142e–02	1.820e–02	2.731e–02	3.712e–02	4.801e–02
4	61	1.589e–01	2.013e+11	4.337e–03	6.880e–03	1.084e–02	1.617e–02	2.193e–02	2.829e–02
4	62	2.793e–02	2.158e+10	3.001e–03	2.479e–03	2.551e–03	3.120e–03	3.910e–03	4.906e–03
4	63			5.229e–04	3.145e–04	1.780e–04	9.771e–05	5.236e–05	2.777e–05
4	64		9.127e+04	2.791e–04	1.855e–04	1.360e–04	1.113e–04	1.004e–04	9.720e–05
4	65		1.405e+07	7.154e–04	7.872e–04	8.980e–04	1.022e–03	1.108e–03	1.206e–03
4	66		2.331e+07	1.634e–03	2.011e–03	2.423e–03	2.830e–03	3.111e–03	3.404e–03
4	67		1.414e+07	1.669e–03	1.969e–03	2.315e–03	2.675e–03	2.936e–03	3.192e–03
4	68		6.440e+07	6.009e–03	6.165e–03	6.751e–03	7.514e–03	8.059e–03	8.732e–03
4	69		1.837e+08	1.598e–02	1.974e–02	2.390e–02	2.801e–02	3.081e–02	3.383e–02
4	70		1.773e+08	1.883e–02	2.307e–02	2.791e–02	3.267e–02	3.585e–02	3.948e–02
4	71		5.529e+06	4.491e–03	2.963e–03	2.091e–03	1.595e–03	1.306e–03	1.192e–03
4	72		1.272e+08	9.072e–03	1.063e–02	1.250e–02	1.444e–02	1.579e–02	1.724e–02
4	73		1.677e+08	6.508e–03	7.950e–03	9.554e–03	1.117e–02	1.228e–02	1.345e–02
4	74		2.201e+08	2.737e–03	3.401e–03	4.118e–03	4.834e–03	5.324e–03	5.834e–03
4	75		3.746e+07	2.880e–03	2.587e–03	2.581e–03	2.723e–03	2.844e–03	3.032e–03
4	76			2.346e–04	1.943e–04	1.756e–04	1.680e–04	1.656e–04	1.658e–04
4	77	6.249e–04	4.047e+08	1.830e–03	1.566e–03	1.439e–03	1.389e–03	1.375e–03	1.388e–03
4	78			1.716e–03	1.129e–03	7.585e–04	5.403e–04	4.172e–04	3.519e–04
4	79			2.138e–03	1.972e–03	1.915e–03	1.905e–03	1.903e–03	1.914e–03
4	80			1.419e–02	1.269e–02	1.203e–02	1.178e–02	1.166e–02	1.166e–02
4	81			4.830e–02	5.241e–02	5.691e–02	6.043e–02	6.256e–02	6.405e–02
4	82			3.555e–02	3.840e–02	4.161e–02	4.415e–02	4.571e–02	4.679e–02
4	83	2.334e–03	1.554e+09	1.888e–02	1.949e–02	2.056e–02	2.154e–02	2.221e–02	2.273e–02
4	84	4.331e–04	4.048e+08	1.673e–02	1.806e–02	1.955e–02	2.077e–02	2.153e–02	2.206e–02
4	85			1.074e–02	1.161e–02	1.256e–02	1.334e–02	1.383e–02	1.416e–02
4	86			1.077e–02	6.476e–03	3.691e–03	2.032e–03	1.088e–03	5.748e–04
4	87			5.277e–03	3.238e–03	1.922e–03	1.134e–03	6.855e–04	4.430e–04
4	88	2.219e–05	3.553e+07	5.672e–04	6.199e–04	6.770e–04	7.208e–04	7.472e–04	7.663e–04
4	89	2.877e–04	2.766e+08	6.015e–04	6.268e–04	6.686e–04	7.059e–04	7.321e–04	7.555e–04
4	90	1.361e–03	9.367e+08	3.187e–04	3.325e–04	3.660e–04	4.089e–04	4.509e–04	4.998e–04
4	91			9.693e–05	6.266e–05	4.194e–05	3.060e–05	2.454e–05	2.153e–05
4	92			4.156e–06	2.991e–06	2.399e–06	2.132e–06	1.999e–06	2.066e–06
4	93		4.954e+05	1.324e–05	1.497e–05	1.742e–05	2.020e–05	2.215e–05	2.440e–05
4	94		6.323e+05	2.980e–05	3.331e–05	3.855e–05	4.449e–05	4.874e–05	5.393e–05
4	95		5.950e+05	3.959e–05	4.214e–05	4.745e–05	5.382e–05	5.815e–05	6.464e–05
4	96		5.358e+05	2.235e–05	2.653e–05	3.173e–05	3.743e–05	4.146e–05	4.600e–05
4	97		7.878e+05	4.431e–05	5.233e–05	6.248e–05	7.376e–05	8.156e–05	8.983e–05
4	98			1.112e–05	6.999e–06	4.621e–06	3.315e–06	2.521e–06	2.272e–06
4	99	6.031e–02	1.072e+11	3.370e–03	4.300e–03	5.820e–03	7.814e–03	1.022e–02	1.233e–02
4	100		9.338e+04	7.980e–06	5.872e–06	4.920e–06	4.531e–06	4.257e–06	4.551e–06
4	101		9.172e+04	2.112e–05	2.036e–05	2.052e–05	2.109e–05	2.146e–05	2.229e–05
4	102		5.060e+04	9.907e–07	8.789e–07	8.855e–07	9.116e–07	9.209e–07	1.053e–06
4	103			6.789e–04	3.985e–04	2.199e–04	1.206e–04	6.627e–05	3.576e–05
4	104			1.268e–04	8.002e–05	4.939e–05	2.981e–05	1.794e–05	1.112e–05
4	105			2.799e–04	1.672e–04	9.948e–05	5.823e–05	3.346e–05	1.897e–05
4	106		6.186e+07	1.350e–03	1.379e–03	1.472e–03	1.649e–03	1.828e–03	1.881e–03
4	107		4.492e+07	3.744e–03	3.458e–03	3.460e–03	3.725e–03	4.041e–03	4.111e–03
4	108		2.182e+07	4.813e–02	4.999e–02	5.166e–02	5.311e–02	5.412e–02	5.457e–02
4	109		1.508e+06	2.213e–03	1.356e–03	8.442e–04	5.425e–04	3.648e–04	2.574e–04
4	110	4.940e–04	4.119e+08	3.147e–05	3.932e–05	5.114e–05	6.549e–05	8.230e–05	9.871e–05
4	111	2.711e–04	5.289e+08	2.223e–04	2.066e–04	2.066e–04	2.187e–04	2.322e–04	2.388e–04
4	112	5.246e–03	6.148e+09	6.128e–04	6.628e–04	7.754e–04	9.295e–04	1.111e–03	1.279e–03
4	113	1.931e–02	1.619e+10	1.110e–03	1.486e–03	1.993e–03	2.578e–03	3.244e–03	3.884e–03
4	114	1.734e–02	1.454e+10	9.413e–04	1.252e–03	1.686e–03	2.196e–03	2.786e–03	3.357e–03
4	115			1.856e–04	1.798e–04	1.859e–04	1.927e–04	1.982e–04	2.033e–04
4	116	9.138e–05	1.793e+08	8.820e–05	7.866e–05	7.631e–05	7.953e–05	8.355e–05	8.512e–05
4	117			4.578e–04	4.984e–04	5.514e–04	5.857e–04	6.091e–04	6.306e–04
4	118	3.812e–02	4.508e+10	5.614e–03	5.273e–03	5.594e–03	6.373e–03	7.482e–03	8.592e–03
4	119	4.575e–03	9.018e+09	2.839e–03	2.514e–03	2.443e–03	2.565e–03	2.732e–03	2.823e–03
4	120	3.037e–02	3.594e+10	4.705e–03	4.287e–03	4.474e–03	5.066e–03	5.935e–03	6.807e–03
4	121	3.752e–01	3.172e+11	1.958e–02	2.672e–02	3.629e–02	4.729e–02	5.998e–02	7.217e–02
4	122	1.612e–04	3.196e+08	1.380e–05	1.680e–05	2.154e–05	2.705e–05	3.417e–05	3.987e–05
4	123			2.199e–05	1.430e–05	9.584e–06	6.974e–06	5.749e–06	5.313e–06

Table 2 (continued)

Low. lev.	Upp. lev.	Osc. str.	Rad. dec. rate	Collision strength Electron impact energy – E ₀ (Ry)					
4	124			1.323 e–05	1.271 e–05	1.301 e–05	1.395 e–05	1.531 e–05	1.677 e–05
4	125			1.936 e–05	1.712 e–05	1.599 e–05	1.573 e–05	1.587 e–05	1.617 e–05
4	126			3.812 e–07	2.193 e–07	1.257 e–07	7.373 e–08	4.544 e–08	2.998 e–08
4	127			1.240 e–03	6.580 e–04	3.321 e–04	1.677 e–04	8.522 e–05	4.311 e–05
4	128	1.969 e–04	2.386 e+08	1.479 e–04	9.847 e–05	6.862 e–05	5.253 e–05	4.655 e–05	4.569 e–05
4	129	1.091 e–04	2.203 e+08	7.913 e–06	9.282 e–06	1.147 e–05	1.398 e–05	1.714 e–05	2.022 e–05
4	130		6.154 e+06	4.586 e–03	3.862 e–03	3.683 e–03	3.797 e–03	4.041 e–03	4.317 e–03
4	131		3.083 e+07	1.245 e–02	1.226 e–02	1.285 e–02	1.376 e–02	1.485 e–02	1.583 e–02
4	132	1.149 e–04	1.395 e+08	2.300 e–04	1.455 e–04	9.169 e–05	5.993 e–05	4.361 e–05	3.593 e–05
4	133		9.303 e+07	3.343 e–02	3.718 e–02	4.169 e–02	4.606 e–02	5.042 e–02	5.400 e–02
4	134			6.781 e–03	4.056 e–03	2.338 e–03	1.318 e–03	7.400 e–04	4.172 e–04
4	135			3.458 e–03	2.845 e–03	2.703 e–03	2.810 e–03	2.934 e–03	2.992 e–03
4	136			6.466 e–03	6.122 e–03	6.409 e–03	6.689 e–03	6.941 e–03	7.192 e–03
4	137			1.292 e–02	1.431 e–02	1.639 e–02	1.751 e–02	1.831 e–02	1.918 e–02
4	138			8.284 e–06	8.727 e–06	9.561 e–06	1.049 e–05	1.154 e–05	1.239 e–05
4	139			3.162 e–03	1.638 e–03	8.045 e–04	3.947 e–04	1.959 e–04	9.665 e–05
4	140			1.542 e–05	1.338 e–05	1.277 e–05	1.292 e–05	1.353 e–05	1.422 e–05
4	141			1.473 e–05	1.284 e–05	1.214 e–05	1.206 e–05	1.260 e–05	1.352 e–05
4	142			3.226 e–05	3.214 e–05	3.354 e–05	3.544 e–05	3.834 e–05	4.202 e–05
4	143		1.502 e+05	6.734 e–05	6.139 e–05	6.169 e–05	6.514 e–05	7.011 e–05	7.545 e–05
4	144		7.729 e+05	1.940 e–04	2.013 e–04	2.172 e–04	2.361 e–04	2.579 e–04	2.759 e–04
4	145		2.237 e+06	5.221 e–04	5.983 e–04	6.818 e–04	7.609 e–04	8.428 e–04	9.044 e–04
4	146			9.658 e–06	6.519 e–06	4.580 e–06	3.471 e–06	2.943 e–06	2.706 e–06
4	147			6.397 e–06	3.735 e–06	2.076 e–06	1.157 e–06	6.592 e–07	3.652 e–07
4	148			9.733 e–06	7.206 e–06	5.884 e–06	5.264 e–06	5.175 e–06	5.395 e–06
4	149			1.130 e–05	1.037 e–05	1.027 e–05	1.054 e–05	1.128 e–05	1.225 e–05
4	150			1.475 e–05	1.222 e–05	1.116 e–05	1.091 e–05	1.140 e–05	1.227 e–05
4	151			2.239 e–06	1.776 e–06	1.584 e–06	1.589 e–06	1.673 e–06	1.768 e–06
4	152			7.769 e–06	8.378 e–06	9.328 e–06	1.061 e–05	1.190 e–05	1.279 e–05
4	153		3.715 e+05	3.377 e–05	3.621 e–05	3.992 e–05	4.506 e–05	5.049 e–05	5.349 e–05
4	154		3.423 e+05	3.250 e–05	3.639 e–05	4.062 e–05	4.564 e–05	5.111 e–05	5.341 e–05
4	155		4.668 e+05	2.316 e–05	2.717 e–05	3.131 e–05	3.579 e–05	4.074 e–05	4.279 e–05
4	156		5.116 e+05	8.818 e–06	1.042 e–05	1.205 e–05	1.376 e–05	1.568 e–05	1.647 e–05
4	157			5.453 e–04	3.272 e–04	1.893 e–04	1.070 e–04	5.998 e–05	3.318 e–05
4	158			3.518 e–06	2.190 e–06	1.291 e–06	7.640 e–07	4.401 e–07	2.495 e–07
4	159			1.889 e–05	1.155 e–05	6.830 e–06	3.999 e–06	2.252 e–06	1.224 e–06

Table 3

Ni XVII oscillator strengths and radiative decay rates for transitions from all other levels. See page 194 for Explanation of Tables.

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
5	6	2.900e−03	9.777e+07	5	7	2.334e−01	1.703e+09	5	8	1.226e−03	1.575e+07
5	9	7.329e−02	6.892e+08	5	10	2.941e−01	2.474e+10	5	11	1.552e−03	4.650e+07
5	12	2.028e−03	3.678e+07	5	14	1.714e+00	4.988e+10	5	15	0.000e+00	4.841e+04
5	16	0.000e+00	8.664e+02	5	17	0.000e+00	5.032e+05	5	20	0.000e+00	7.381e+04
5	24	0.000e+00	9.013e+03	5	25	0.000e+00	6.211e+05	5	26	0.000e+00	1.476e+06
5	30	2.729e−03	5.192e+08	5	33	1.123e−03	2.157e+08	5	35	1.987e−03	2.230e+09
5	36	2.768e−03	1.947e+09	5	37	1.555e−01	3.385e+11	5	39	0.000e+00	2.719e+07
5	40	0.000e+00	6.086e+05	5	41	0.000e+00	5.296e+07	5	42	2.536e−03	2.454e+09
5	43	3.077e−03	1.788e+09	5	45	7.149e−01	4.170e+11	5	47	0.000e+00	6.286e+04
5	50	0.000e+00	2.016e+06	5	51	0.000e+00	2.174e+06	5	53	0.000e+00	3.457e+08
5	54	1.087e−01	1.193e+11	5	55	7.962e−02	8.895e+10	5	56	1.328e−02	8.915e+09
5	57	1.967e−03	6.629e+09	5	58	6.194e−02	7.042e+10	5	60	7.063e−02	4.859e+10
5	61	1.909e−02	2.195e+10	5	62	4.947e−01	3.471e+11	5	63	6.868e−02	2.483e+11
5	64	0.000e+00	9.531e+07	5	65	0.000e+00	8.373e+06	5	66	0.000e+00	2.056e+07
5	67	0.000e+00	3.777e+07	5	68	0.000e+00	9.282e+07	5	69	0.000e+00	1.851e+07
5	71	0.000e+00	2.130e+08	5	72	0.000e+00	2.736e+07	5	73	0.000e+00	4.321e+07
5	75	0.000e+00	1.481e+08	5	79	1.027e−03	8.550e+08	5	84	3.184e−04	2.727e+08
5	87	1.766e−02	1.544e+10	5	91	5.282e−03	4.707e+09	5	92	0.000e+00	2.498e+05
5	95	0.000e+00	8.680e+04	5	96	0.000e+00	5.638e+04	5	99	4.642e−04	7.602e+08
5	103	4.620e−02	2.289e+11	5	104	0.000e+00	5.502e+06	5	105	0.000e+00	6.264e+05
5	107	0.000e+00	3.657e+06	5	108	0.000e+00	2.452e+05	5	109	0.000e+00	7.435e+07
5	111	3.938e−04	7.107e+08	5	112	1.836e−04	1.991e+08	5	116	1.279e−03	2.323e+09
5	118	1.058e−01	1.158e+11	5	119	1.025e−03	1.870e+09	5	120	1.907e−01	2.088e+11
5	122	3.742e−05	6.865e+07	5	123	1.064e−03	1.175e+09	5	128	5.522e−03	6.198e+09
5	130	0.000e+00	3.444e+05	5	131	0.000e+00	1.763e+05	5	132	7.979e−03	8.977e+09
5	134	0.000e+00	7.943e+07	5	143	0.000e+00	1.098e+05	5	146	0.000e+00	5.238e+06
5	147	8.167e−04	4.755e+09	5	157	0.000e+00	2.804e+06	5	158	0.000e+00	8.948e+06
6	19	5.720e−01	3.037e+10	6	23	6.766e−04	3.894e+07	6	26	5.384e−03	4.345e+08
6	27	0.000e+00	9.542e+03	6	43	0.000e+00	2.772e+05	6	47	1.272e−01	1.006e+11
6	49	5.970e−03	4.927e+09	6	56	0.000e+00	4.650e+07	6	60	0.000e+00	2.754e+06
6	62	0.000e+00	5.531e+05	6	65	5.563e−01	5.882e+11	6	73	1.720e−02	1.888e+10
6	75	2.331e−02	2.581e+10	6	79	0.000e+00	3.807e+08	6	84	0.000e+00	2.893e+07
6	87	0.000e+00	1.093e+06	6	89	0.000e+00	2.356e+06	6	91	0.000e+00	3.959e+04
6	93	3.161e−03	4.285e+09	6	107	1.931e−04	2.805e+08	6	109	5.273e−04	7.741e+08
6	118	0.000e+00	4.965e+05	6	120	0.000e+00	4.721e+04	6	123	0.000e+00	1.466e+05
6	151	8.270e−04	1.387e+09	6	158	2.362e−04	4.071e+08	7	15	1.142e−01	2.624e+09
7	16	1.814e−02	3.188e+08	7	17	6.354e−01	1.661e+10	7	19	5.670e−04	2.900e+07
7	20	2.345e−02	7.267e+08	7	21	4.142e−01	9.772e+09	7	23	3.688e−02	2.049e+09
7	24	1.130e−01	3.775e+09	7	25	7.073e−01	2.255e+10	7	26	7.478e−03	5.857e+08
7	29	0.000e+00	1.242e+04	7	30	0.000e+00	4.746e+05	7	33	0.000e+00	1.438e+05
7	34	0.000e+00	1.288e+06	7	35	0.000e+00	4.329e+05	7	37	0.000e+00	1.743e+07
7	39	3.044e−02	1.913e+10	7	41	8.145e−02	5.185e+10	7	42	0.000e+00	1.429e+05
7	43	0.000e+00	1.978e+05	7	45	0.000e+00	1.745e+07	7	47	1.439e−01	1.127e+11
7	48	9.256e−02	4.465e+10	7	49	2.335e−01	1.909e+11	7	51	4.395e−04	1.584e+08
7	53	8.913e−01	3.277e+11	7	54	0.000e+00	7.917e+07	7	55	0.000e+00	3.421e+07
7	56	0.000e+00	1.774e+07	7	57	0.000e+00	3.995e+07	7	58	0.000e+00	2.082e+06
7	59	0.000e+00	1.454e+07	7	60	0.000e+00	1.875e+05	7	61	0.000e+00	1.334e+07
7	62	0.000e+00	4.530e+07	7	63	0.000e+00	1.352e+08	7	64	2.174e−01	1.367e+11
7	65	2.133e−03	2.237e+09	7	66	9.537e−03	6.006e+09	7	67	9.224e−01	4.157e+11
7	68	2.011e−01	1.295e+11	7	69	9.239e−03	4.256e+09	7	70	0.000e+00	8.040e+03
7	71	9.358e−01	4.348e+11	7	72	4.019e−02	2.622e+10	7	73	6.790e−02	7.389e+10
7	75	4.633e−03	5.090e+09	7	76	0.000e+00	9.463e+07	7	77	0.000e+00	4.607e+07
7	78	0.000e+00	1.419e+08	7	79	0.000e+00	1.079e+06	7	80	0.000e+00	1.121e+08
7	82	0.000e+00	8.185e+07	7	83	0.000e+00	2.989e+07	7	84	0.000e+00	6.639e+07
7	85	0.000e+00	1.877e+07	7	86	0.000e+00	5.300e+08	7	87	0.000e+00	2.865e+07
7	88	0.000e+00	9.005e+05	7	89	0.000e+00	4.723e+05	7	90	0.000e+00	6.743e+05
7	91	0.000e+00	3.684e+05	7	92	3.787e−02	3.042e+10	7	93	7.490e−04	1.008e+09
7	94	4.447e−03	3.594e+09	7	95	6.919e−04	4.003e+08	7	96	7.990e−03	6.480e+09
7	97	6.564e−04	3.815e+08	7	100	3.113e−04	4.262e+08	7	101	4.687e−04	3.852e+08
7	103	0.000e+00	1.951e+06	7	104	7.173e−03	4.262e+09	7	105	1.010e−02	1.406e+10
7	107	2.714e−04	3.914e+08	7	108	8.052e−05	6.989e+07	7	109	9.424e−03	1.374e+10
7	110	0.000e+00	2.805e+07	7	111	0.000e+00	3.444e+06	7	112	0.000e+00	6.833e+04
7	113	0.000e+00	6.258e+04	7	114	0.000e+00	2.051e+06	7	115	0.000e+00	7.379e+04
7	116	0.000e+00	3.212e+07	7	119	0.000e+00	1.547e+05	7	121	0.000e+00	1.453e+05
7	122	0.000e+00	4.020e+05	7	123	0.000e+00	3.564e+05	7	126	0.000e+00	2.323e+05
7	127	0.000e+00	2.920e+06	7	128	0.000e+00	1.172e+07	7	131	3.747e−04	2.546e+08
7	132	0.000e+00	2.183e+07	7	134	1.336e−01	9.112e+10	7	139	0.000e+00	3.827e+07
7	146	5.111e−04	5.032e+08	7	147	0.000e+00	2.899e+07	7	153	1.550e−03	1.108e+09
7	154	1.534e−04	1.538e+08	7	157	1.461e−02	1.053e+10	8	10	0.000e+00	3.654e+03
8	15	2.187e−03	4.867e+07	8	17	5.211e−02	1.322e+09	8	19	1.028e−01	5.115e+09
8	20	8.943e−01	2.697e+10	8	22	1.518e−01	2.459e+10	8	23	3.262e−01	1.765e+10
8	24	1.636e−01	5.321e+09	8	26	1.461e−03	1.119e+08	8	27	0.000e+00	8.656e+03
8	28	0.000e+00	1.350e+04	8	40	4.359e−05	1.651e+07	8	42	0.000e+00	9.787e+05

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
8	43	0.000e+00	8.964e+04	8	44	0.000e+00	1.431e+05	8	46	1.412e-01	3.278e+11
8	47	9.174e-02	7.135e+10	8	48	1.701e-01	8.151e+10	8	49	1.165e-02	9.460e+09
8	54	0.000e+00	4.237e+07	8	55	0.000e+00	5.292e+07	8	56	0.000e+00	1.679e+07
8	58	0.000e+00	1.818e+05	8	59	0.000e+00	3.916e+07	8	60	0.000e+00	1.373e+07
8	61	0.000e+00	3.104e+06	8	62	0.000e+00	5.513e+06	8	64	1.411e-03	8.818e+08
8	65	2.183e-01	2.275e+11	8	66	9.924e-01	6.212e+11	8	68	2.224e-01	1.423e+11
8	72	6.255e-03	4.056e+09	8	73	2.186e-01	2.365e+11	8	74	1.398e-01	4.558e+11
8	75	1.094e-02	1.194e+10	8	76	0.000e+00	6.611e+06	8	77	0.000e+00	3.137e+08
8	79	0.000e+00	1.795e+08	8	80	0.000e+00	1.961e+08	8	83	0.000e+00	4.169e+06
8	84	0.000e+00	1.270e+08	8	85	0.000e+00	2.992e+08	8	87	0.000e+00	2.318e+06
8	88	0.000e+00	1.363e+07	8	89	0.000e+00	1.782e+06	8	90	0.000e+00	1.110e+06
8	92	6.454e-05	5.156e+07	8	93	2.348e-03	3.142e+09	8	94	4.262e-03	3.427e+09
8	96	2.948e-03	2.378e+09	8	100	2.944e-04	4.009e+08	8	102	1.029e-04	4.205e+08
8	106	1.051e-04	4.519e+08	8	107	9.036e-05	1.296e+08	8	108	1.096e-04	9.462e+07
8	111	0.000e+00	1.319e+05	8	119	0.000e+00	3.867e+05	8	121	0.000e+00	1.333e+05
8	123	0.000e+00	1.598e+05	8	124	0.000e+00	1.703e+05	8	151	3.716e-04	6.160e+08
8	152	1.819e-03	1.810e+09	8	155	2.545e-04	4.237e+08	8	156	1.644e-04	8.215e+08
9	15	8.532e-03	1.672e+08	9	16	1.387e-02	2.092e+08	9	17	8.443e-02	1.903e+09
9	19	6.573e-03	2.933e+08	9	20	5.075e-02	1.373e+09	9	21	1.275e+00	2.637e+10
9	23	1.595e-01	7.773e+09	9	24	7.183e-01	2.105e+10	9	25	2.371e-01	6.754e+09
9	26	2.317e-03	1.626e+08	9	28	0.000e+00	5.494e+03	9	29	0.000e+00	9.428e+03
9	30	0.000e+00	1.236e+05	9	33	0.000e+00	4.954e+04	9	34	0.000e+00	3.196e+05
9	35	0.000e+00	1.399e+05	9	37	0.000e+00	4.318e+06	9	39	7.285e-03	4.407e+09
9	41	1.905e-02	1.168e+10	9	42	0.000e+00	1.779e+05	9	43	0.000e+00	9.765e+05
9	44	0.000e+00	2.705e+05	9	45	0.000e+00	3.785e+06	9	47	6.837e-02	5.176e+10
9	48	4.308e-01	2.010e+11	9	49	1.545e-01	1.222e+11	9	53	2.576e-01	9.168e+10
9	54	0.000e+00	1.336e+05	9	55	0.000e+00	1.013e+07	9	56	0.000e+00	2.848e+07
9	57	0.000e+00	2.794e+07	9	58	0.000e+00	7.264e+07	9	59	0.000e+00	6.141e+07
9	60	0.000e+00	4.816e+07	9	61	0.000e+00	5.518e+05	9	62	0.000e+00	4.047e+06
9	63	0.000e+00	5.587e+07	9	64	8.024e-05	4.901e+07	9	65	4.474e-03	4.555e+09
9	66	7.146e-02	4.370e+10	9	67	3.743e-01	1.638e+11	9	68	1.846e-02	1.154e+10
9	69	1.132e+00	5.067e+11	9	70	0.000e+00	1.511e+04	9	71	4.252e-01	1.919e+11
9	72	7.022e-01	4.450e+11	9	73	9.688e-02	1.024e+11	9	75	7.437e-02	7.938e+10
9	77	0.000e+00	2.788e+07	9	78	0.000e+00	8.934e+07	9	79	0.000e+00	2.497e+06
9	80	0.000e+00	3.362e+06	9	82	0.000e+00	2.980e+08	9	83	0.000e+00	3.792e+08
9	84	0.000e+00	1.968e+08	9	85	0.000e+00	7.853e+07	9	86	0.000e+00	2.191e+08
9	87	0.000e+00	2.498e+07	9	88	0.000e+00	3.482e+06	9	89	0.000e+00	7.876e+06
9	90	0.000e+00	5.298e+06	9	92	1.000e-02	7.829e+09	9	94	6.046e-03	4.761e+09
9	95	6.099e-03	3.438e+09	9	96	1.555e-04	1.229e+08	9	97	7.328e-03	4.151e+09
9	100	6.537e-04	8.722e+08	9	101	2.061e-03	1.651e+09	9	103	0.000e+00	5.311e+05
9	104	1.983e-03	1.148e+09	9	105	3.233e-03	4.385e+09	9	107	5.034e-04	7.080e+08
9	108	3.453e-04	2.923e+08	9	109	2.623e-03	3.729e+09	9	110	0.000e+00	9.129e+06
9	111	0.000e+00	6.024e+05	9	114	0.000e+00	3.867e+05	9	116	0.000e+00	9.645e+06
9	118	0.000e+00	1.194e+05	9	119	0.000e+00	3.724e+05	9	120	0.000e+00	9.957e+04
9	121	0.000e+00	1.718e+05	9	122	0.000e+00	1.446e+05	9	124	0.000e+00	1.287e+05
9	125	0.000e+00	3.841e+05	9	127	0.000e+00	8.179e+05	9	128	0.000e+00	3.842e+06
9	132	0.000e+00	6.685e+06	9	134	4.164e-02	2.772e+10	9	139	0.000e+00	1.284e+07
9	147	0.000e+00	9.075e+06	9	153	1.675e-03	1.169e+09	9	154	9.118e-04	8.936e+08
9	155	2.132e-04	3.486e+08	9	157	4.831e-03	3.403e+09	10	19	2.180e-03	6.226e+07
10	26	5.909e-01	2.929e+10	10	30	0.000e+00	6.345e+00	10	39	2.487e-04	1.346e+08
10	41	1.180e-03	6.475e+08	10	47	6.273e-04	4.298e+08	10	49	8.890e-02	6.379e+10
10	60	0.000e+00	3.461e+06	10	62	0.000e+00	3.488e+07	10	65	6.919e-03	6.468e+09
10	73	1.347e-01	1.310e+11	10	75	5.147e-01	5.054e+11	10	79	0.000e+00	3.782e+05
10	84	0.000e+00	4.503e+06	10	87	0.000e+00	3.769e+08	10	89	0.000e+00	2.378e+06
10	91	0.000e+00	2.355e+06	10	100	1.618e-04	2.004e+08	10	105	3.308e-03	4.167e+09
10	107	4.541e-04	5.939e+08	10	109	1.536e-02	2.032e+10	10	118	0.000e+00	2.740e+06
10	120	0.000e+00	3.949e+06	10	128	0.000e+00	4.198e+05	10	132	0.000e+00	6.698e+05
10	158	8.640e-03	1.353e+10	11	15	3.364e-01	3.561e+09	11	17	4.970e-02	6.349e+08
11	19	9.466e-02	2.526e+09	11	20	5.655e-02	9.175e+08	11	22	1.532e-01	1.370e+10
11	23	3.199e-01	9.558e+09	11	24	1.098e-01	1.974e+09	11	26	1.486e-03	7.000e+07
11	27	0.000e+00	1.104e+06	11	28	0.000e+00	4.046e+05	11	30	0.000e+00	9.494e+04
11	32	0.000e+00	1.162e+06	11	33	0.000e+00	1.487e+05	11	36	0.000e+00	7.371e+06
11	38	6.680e-02	1.067e+11	11	39	3.626e-02	1.932e+10	11	40	3.131e-03	1.014e+09
11	41	1.281e-02	6.920e+09	11	42	0.000e+00	1.243e+07	11	43	0.000e+00	1.216e+07
11	44	0.000e+00	1.037e+06	11	45	0.000e+00	3.961e+05	11	46	1.668e-03	3.363e+09
11	47	1.123e-03	7.592e+08	11	49	1.339e-04	9.479e+07	11	50	2.727e+00	1.193e+12
11	54	0.000e+00	4.558e+05	11	55	0.000e+00	1.161e+06	11	56	0.000e+00	1.027e+06
11	58	0.000e+00	2.445e+05	11	59	0.000e+00	6.835e+04	11	62	0.000e+00	5.561e+04
11	64	2.020e-02	1.119e+10	11	65	2.665e-03	2.462e+09	11	66	6.554e-03	3.637e+09
11	68	1.117e-02	6.343e+09	11	72	3.671e-04	2.115e+08	11	73	1.537e-03	1.477e+09
11	74	5.139e-04	1.489e+09	11	79	0.000e+00	2.180e+05	11	88	0.000e+00	8.074e+04
11	89	0.000e+00	6.811e+04	11	92	6.651e-02	4.778e+10	11	93	1.368e-01	1.646e+11
11	94	1.640e-02	1.186e+10	11	96	2.550e-01	1.851e+11	11	99	0.000e+00	4.875e+06
11	100	8.062e-02	9.883e+10	11	101	7.263e-03	5.345e+09	11	102	6.932e-02	2.551e+11

(continued on next page)

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
11	106	9.451e−03	3.668e+10	11	107	6.855e−03	8.877e+09	11	108	4.486e−04	3.497e+08
11	109	1.491e−04	1.954e+08	11	110	0.000e+00	3.315e+06	11	111	0.000e+00	7.349e+07
11	112	0.000e+00	8.633e+07	11	113	0.000e+00	1.441e+08	11	114	0.000e+00	7.505e+07
11	116	0.000e+00	1.153e+07	11	119	0.000e+00	1.054e+05	11	120	0.000e+00	3.405e+05
11	122	0.000e+00	4.312e+07	11	123	0.000e+00	1.218e+08	11	124	0.000e+00	4.014e+07
11	128	0.000e+00	1.591e+07	11	129	0.000e+00	9.526e+07	11	130	5.360e−01	4.601e+11
11	132	0.000e+00	4.081e+06	11	135	0.000e+00	1.835e+08	11	143	4.188e−03	3.691e+09
12	15	9.799e−02	1.026e+09	12	16	5.834e−01	4.826e+09	12	17	1.514e−02	1.914e+08
12	19	2.948e−01	7.791e+09	12	20	3.551e−02	5.709e+08	12	21	2.006e−01	2.516e+09
12	23	1.265e−01	3.747e+09	12	24	5.061e−01	9.020e+09	12	25	3.393e−03	6.360e+07
12	26	6.189e−03	2.894e+08	12	27	0.000e+00	7.887e+05	12	28	0.000e+00	9.996e+05
12	29	0.000e+00	3.413e+05	12	30	0.000e+00	1.866e+05	12	31	0.000e+00	2.531e+06
12	32	0.000e+00	2.126e+05	12	33	0.000e+00	7.114e+05	12	36	0.000e+00	1.226e+07
12	39	1.098e−01	5.835e+10	12	40	4.733e−02	1.530e+10	12	41	3.847e−02	2.074e+10
12	42	0.000e+00	2.075e+07	12	43	0.000e+00	8.702e+06	12	44	0.000e+00	1.036e+07
12	45	0.000e+00	2.430e+05	12	47	2.927e−03	1.975e+09	12	48	1.116e−03	4.647e+08
12	49	9.819e−04	6.939e+08	12	50	5.050e−01	2.206e+11	12	51	4.046e+00	1.263e+12
12	54	0.000e+00	9.456e+05	12	55	0.000e+00	3.126e+05	12	56	0.000e+00	8.497e+05
12	57	0.000e+00	1.272e+06	12	58	0.000e+00	6.981e+05	12	59	0.000e+00	6.418e+05
12	60	0.000e+00	1.507e+05	12	61	0.000e+00	1.807e+05	12	62	0.000e+00	2.428e+05
12	63	0.000e+00	2.784e+05	12	64	1.658e−03	9.171e+08	12	65	1.615e−03	1.490e+09
12	66	5.746e−04	3.183e+08	12	67	2.156e−02	8.549e+09	12	68	9.674e−03	5.486e+09
12	69	1.206e−02	4.894e+09	12	71	1.990e−02	8.151e+09	12	72	1.331e−03	7.654e+08
12	73	2.011e−04	1.930e+08	12	75	5.251e−04	5.090e+08	12	82	0.000e+00	1.669e+05
12	86	0.000e+00	1.497e+05	12	88	0.000e+00	1.302e+05	12	89	0.000e+00	5.308e+04
12	90	0.000e+00	5.835e+04	12	92	4.421e−02	3.171e+10	12	93	8.652e−02	1.040e+11
12	94	1.958e−01	1.414e+11	12	95	1.132e−01	5.850e+10	12	96	2.938e−02	2.129e+10
12	97	3.565e−01	1.852e+11	12	99	0.000e+00	8.043e+06	12	100	1.237e−01	1.514e+11
12	101	9.452e−02	6.947e+10	12	104	2.128e−04	1.131e+08	12	105	9.228e−03	1.149e+10
12	107	1.984e−02	2.566e+10	12	108	6.711e−03	5.225e+09	12	109	8.042e−04	1.052e+09
12	110	0.000e+00	1.192e+07	12	111	0.000e+00	1.272e+08	12	112	0.000e+00	5.639e+07
12	113	0.000e+00	1.020e+06	12	114	0.000e+00	1.123e+08	12	115	0.000e+00	2.335e+08
12	116	0.000e+00	4.065e+06	12	118	0.000e+00	1.427e+05	12	120	0.000e+00	1.658e+05
12	121	0.000e+00	3.622e+05	12	122	0.000e+00	7.159e+07	12	123	0.000e+00	9.483e+07
12	124	0.000e+00	1.126e+08	12	125	0.000e+00	3.285e+07	12	126	0.000e+00	2.278e+08
12	127	0.000e+00	6.080e+05	12	128	0.000e+00	4.567e+07	12	129	0.000e+00	1.765e+07
12	130	9.904e−02	8.491e+10	12	131	7.935e−01	4.860e+11	12	132	0.000e+00	3.116e+07
12	134	2.564e−04	1.576e+08	12	135	0.000e+00	5.054e+07	12	136	0.000e+00	1.962e+08
12	143	7.870e−04	6.928e+08	12	144	5.912e−03	3.721e+09	12	147	0.000e+00	4.277e+05
13	15	1.175e−03	1.208e+07	13	16	1.522e−01	1.238e+09	13	17	5.147e−02	6.401e+08
13	18	1.008e+00	7.151e+09	13	20	5.498e−01	8.711e+09	13	21	7.355e−01	9.095e+09
13	24	1.007e−01	1.770e+09	13	25	1.434e−02	2.658e+08	13	27	0.000e+00	7.472e+04
13	28	0.000e+00	5.891e+05	13	29	0.000e+00	1.672e+06	13	30	0.000e+00	3.672e+05
13	32	0.000e+00	1.169e+06	13	33	0.000e+00	1.053e+06	13	34	0.000e+00	3.883e+03
13	36	0.000e+00	1.712e+07	13	40	2.678e−01	8.630e+10	13	42	0.000e+00	2.374e+06
13	43	0.000e+00	1.388e+07	13	44	0.000e+00	2.481e+07	13	45	0.000e+00	4.690e+05
13	48	6.740e−03	2.799e+09	13	50	1.444e−02	6.292e+09	13	51	5.063e−01	1.576e+11
13	52	5.867e+00	1.421e+12	13	54	0.000e+00	6.867e+04	13	56	0.000e+00	5.899e+05
13	58	0.000e+00	4.944e+05	13	59	0.000e+00	1.544e+06	13	60	0.000e+00	1.228e+06
13	61	0.000e+00	6.896e+05	13	62	0.000e+00	8.714e+04	13	64	1.740e−04	9.603e+07
13	66	1.711e−03	9.454e+08	13	67	3.630e−04	1.435e+08	13	68	6.945e−04	3.929e+08
13	69	1.559e−02	6.313e+09	13	70	6.937e−02	2.203e+10	13	71	9.646e−04	3.941e+08
13	72	9.226e−04	5.294e+08	13	78	0.000e+00	1.640e+05	13	81	0.000e+00	1.689e+05
13	89	0.000e+00	8.721e+04	13	90	0.000e+00	1.558e+05	13	92	8.113e−04	5.807e+08
13	94	1.031e−01	7.426e+10	13	95	3.820e−01	1.970e+11	13	96	2.491e−02	1.801e+10
13	97	1.279e−01	6.632e+10	13	98	5.864e−01	2.372e+11	13	99	0.000e+00	1.111e+07
13	101	2.428e−01	1.781e+11	13	104	7.308e−03	3.877e+09	13	108	3.740e−02	2.906e+10
13	110	0.000e+00	3.984e+06	13	111	0.000e+00	1.188e+07	13	112	0.000e+00	8.651e+07
13	113	0.000e+00	1.041e+08	13	114	0.000e+00	4.629e+07	13	115	0.000e+00	4.157e+07
13	116	0.000e+00	4.355e+06	13	117	0.000e+00	2.783e+08	13	121	0.000e+00	2.330e+05
13	122	0.000e+00	8.541e+07	13	123	0.000e+00	1.006e+07	13	124	0.000e+00	7.493e+07
13	125	0.000e+00	1.943e+08	13	127	0.000e+00	3.663e+05	13	128	0.000e+00	9.098e+07
13	129	0.000e+00	1.153e+08	13	130	2.826e−03	2.418e+09	13	131	9.897e−02	6.050e+10
13	132	0.000e+00	4.112e+07	13	133	1.148e+00	5.460e+11	13	135	0.000e+00	3.322e+06
13	136	0.000e+00	3.878e+07	13	137	0.000e+00	2.322e+08	13	138	1.172e−04	5.675e+07
13	140	1.097e−04	5.324e+07	13	144	7.305e−04	4.589e+08	13	145	7.906e−03	3.867e+09
14	15	1.935e−02	8.522e+07	14	16	6.257e−03	2.297e+07	14	17	1.381e−01	8.082e+08
14	19	5.348e−03	7.220e+07	14	20	1.046e−02	8.639e+07	14	21	5.078e−03	3.382e+07
14	24	8.299e−04	7.899e+06	14	25	1.893e+00	2.149e+10	14	26	5.362e−01	1.547e+10
14	30	0.000e+00	1.001e+06	14	33	0.000e+00	3.670e+05	14	34	0.000e+00	9.160e+05
14	35	0.000e+00	2.610e+06	14	37	0.000e+00	1.749e+07	14	39	2.049e−02	9.552e+09
14	41	5.144e−02	2.434e+10	14	43	0.000e+00	4.520e+05	14	45	0.000e+00	1.536e+07
14	47	1.958e−02	1.176e+10	14	48	6.633e−04	2.463e+08	14	49	1.452e−01	9.157e+10
14	53	3.404e+00	9.718e+11	14	54	0.000e+00	1.230e+07	14	55	0.000e+00	9.408e+06

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
14	56	0.000e+00	4.036e+05	14	57	0.000e+00	9.075e+05	14	58	0.000e+00	6.172e+06
14	59	0.000e+00	5.976e+04	14	60	0.000e+00	2.319e+06	14	61	0.000e+00	1.694e+06
14	62	0.000e+00	1.111e+07	14	63	0.000e+00	1.823e+07	14	64	6.483e−02	3.249e+10
14	66	1.748e−02	8.772e+09	14	67	1.316e−01	4.727e+10	14	68	4.128e−02	2.123e+10
14	69	6.956e−02	2.561e+10	14	70	0.000e+00	5.124e+03	14	71	4.946e−01	1.838e+11
14	72	1.854e−02	9.675e+09	14	73	9.071e−04	7.900e+08	14	75	7.158e−04	6.300e+08
14	76	0.000e+00	1.473e+07	14	77	0.000e+00	1.491e+07	14	78	0.000e+00	4.323e+06
14	79	0.000e+00	4.650e+05	14	80	0.000e+00	1.423e+07	14	83	0.000e+00	4.669e+06
14	86	0.000e+00	9.687e+07	14	87	0.000e+00	6.868e+06	14	90	0.000e+00	3.487e+04
14	91	0.000e+00	9.931e+05	14	92	2.585e−01	1.700e+11	14	93	3.338e−03	3.680e+09
14	94	5.792e−02	3.836e+10	14	95	1.397e−02	6.626e+09	14	96	3.999e−02	2.658e+10
14	97	1.038e−03	4.949e+08	14	100	3.555e−03	3.994e+09	14	101	1.056e−02	7.121e+09
14	103	0.000e+00	4.909e+06	14	104	6.913e−01	3.376e+11	14	105	1.151e−01	1.317e+11
14	107	2.530e−03	3.010e+09	14	109	6.336e−02	7.631e+10	14	110	0.000e+00	1.674e+08
14	111	0.000e+00	9.788e+06	14	113	0.000e+00	1.799e+05	14	114	0.000e+00	1.446e+07
14	116	0.000e+00	1.300e+08	14	118	0.000e+00	3.250e+05	14	119	0.000e+00	1.186e+06
14	120	0.000e+00	3.744e+05	14	121	0.000e+00	1.826e+05	14	122	0.000e+00	2.613e+06
14	123	0.000e+00	6.631e+05	14	124	0.000e+00	2.922e+05	14	125	0.000e+00	1.552e+05
14	126	0.000e+00	2.221e+05	14	127	0.000e+00	1.659e+07	14	128	0.000e+00	6.563e+07
14	132	0.000e+00	1.342e+08	14	134	7.266e−01	4.128e+11	14	136	0.000e+00	1.177e+05
14	139	0.000e+00	4.236e+08	14	143	2.065e−04	1.681e+08	14	146	8.772e−03	7.217e+09
14	147	0.000e+00	1.713e+08	14	157	7.409e−03	4.474e+09	15	27	5.490e−01	1.871e+10
15	28	2.529e−02	6.222e+08	15	30	1.106e−01	4.390e+09	15	32	1.071e−04	7.158e+06
15	33	1.429e−02	5.791e+08	15	38	0.000e+00	2.675e+05	15	39	0.000e+00	2.946e+04
15	41	0.000e+00	9.439e+04	15	42	1.498e−02	6.881e+09	15	43	2.493e−03	6.880e+08
15	46	0.000e+00	2.049e+07	15	47	0.000e+00	8.785e+06	15	48	0.000e+00	2.911e+05
15	49	0.000e+00	3.584e+05	15	54	1.594e−01	8.775e+10	15	55	2.894e−02	1.632e+10
15	56	3.037e−02	1.030e+10	15	58	2.814e−03	1.627e+09	15	59	5.318e−04	1.325e+08
15	62	4.509e−03	1.627e+09	15	64	0.000e+00	1.722e+07	15	65	0.000e+00	1.505e+07
15	66	0.000e+00	8.272e+06	15	67	0.000e+00	6.515e+06	15	68	0.000e+00	1.218e+06
15	69	0.000e+00	1.566e+06	15	70	0.000e+00	1.135e+05	15	73	0.000e+00	1.845e+05
15	74	0.000e+00	1.522e+06	15	76	4.034e+00	1.296e+12	15	77	1.146e−01	3.716e+10
15	79	3.093e−01	1.411e+11	15	80	1.644e−01	5.451e+10	15	83	3.749e−03	1.264e+09
15	84	4.129e−04	1.957e+08	15	85	2.828e−02	2.244e+10	15	87	1.824e−02	8.887e+09
15	88	1.465e−01	1.202e+11	15	89	6.467e−02	3.189e+10	15	90	8.490e−04	2.999e+08
15	91	2.373e−02	1.186e+10	15	92	0.000e+00	7.737e+05	15	93	0.000e+00	1.688e+07
15	95	0.000e+00	9.098e+05	15	96	0.000e+00	3.182e+07	15	97	0.000e+00	7.113e+06
15	98	0.000e+00	1.300e+05	15	100	0.000e+00	4.016e+07	15	101	0.000e+00	3.380e+06
15	102	0.000e+00	7.579e+07	15	104	0.000e+00	5.522e+06	15	105	0.000e+00	1.507e+06
15	106	0.000e+00	1.185e+06	15	107	0.000e+00	1.874e+05	15	108	0.000e+00	4.500e+04
15	109	0.000e+00	5.155e+05	15	110	2.231e−01	1.025e+11	15	111	5.065e−02	5.452e+10
15	112	2.813e−03	1.820e+09	15	113	3.595e−01	1.664e+11	15	114	3.235e−01	1.498e+11
15	116	7.976e−03	8.651e+09	15	118	2.839e−03	1.859e+09	15	119	4.164e−03	4.544e+09
15	120	9.986e−03	6.544e+09	15	122	8.341e−05	9.170e+07	15	123	2.311e−01	1.531e+11
15	124	7.797e−03	3.695e+09	15	128	1.923e−02	1.300e+10	15	132	1.745e−02	1.184e+10
15	134	0.000e+00	1.584e+06	15	135	8.019e−05	3.936e+07	15	138	0.000e+00	2.852e+08
15	140	0.000e+00	9.984e+07	15	143	0.000e+00	6.453e+07	15	144	0.000e+00	1.309e+07
15	145	0.000e+00	1.905e+05	15	146	0.000e+00	1.435e+07	15	148	0.000e+00	1.552e+08
15	149	0.000e+00	1.066e+07	15	151	0.000e+00	1.633e+07	15	152	0.000e+00	2.501e+06
15	153	0.000e+00	6.972e+05	15	154	0.000e+00	8.040e+05	15	155	0.000e+00	4.852e+05
15	156	0.000e+00	1.982e+06	15	157	0.000e+00	2.613e+07	15	158	0.000e+00	8.683e+06
16	27	6.899e−02	2.218e+09	16	28	7.973e−01	1.851e+10	16	29	4.244e−03	7.759e+07
16	30	8.785e−03	3.304e+08	16	33	2.968e−03	1.140e+08	16	34	1.573e−02	3.379e+08
16	39	0.000e+00	8.833e+04	16	40	0.000e+00	5.403e+04	16	41	0.000e+00	1.291e+05
16	43	1.956e−02	5.289e+09	16	44	2.586e−03	5.008e+08	16	45	2.107e−03	5.731e+08
16	47	0.000e+00	1.553e+07	16	48	0.000e+00	3.156e+06	16	49	0.000e+00	1.717e+06
16	56	2.778e−01	9.252e+10	16	59	2.270e−02	5.555e+09	16	60	1.161e−02	4.003e+09
16	62	2.918e−03	1.034e+09	16	64	0.000e+00	4.973e+06	16	65	0.000e+00	4.346e+06
16	66	0.000e+00	4.098e+06	16	67	0.000e+00	1.877e+07	16	68	0.000e+00	1.133e+07
16	69	0.000e+00	1.232e+06	16	70	0.000e+00	3.895e+06	16	71	0.000e+00	5.597e+06
16	73	0.000e+00	3.259e+06	16	75	0.000e+00	1.067e+05	16	76	1.749e−01	5.528e+10
16	77	8.752e−02	2.794e+10	16	78	4.686e+00	1.164e+12	16	79	1.567e−02	7.037e+09
16	80	4.542e−01	1.482e+11	16	82	9.537e−01	2.430e+11	16	83	8.739e−03	2.901e+09
16	84	6.328e−02	2.953e+10	16	86	1.270e−01	3.358e+10	16	87	4.029e−03	1.933e+09
16	89	2.343e−01	1.138e+11	16	90	7.368e−02	2.564e+10	16	91	1.567e−02	7.715e+09
16	92	0.000e+00	3.280e+06	16	93	0.000e+00	2.380e+07	16	94	0.000e+00	1.526e+07
16	95	0.000e+00	9.072e+04	16	96	0.000e+00	1.110e+06	16	97	0.000e+00	2.570e+07
16	98	0.000e+00	8.288e+06	16	100	0.000e+00	4.232e+07	16	101	0.000e+00	3.061e+07
16	104	0.000e+00	4.908e+05	16	105	0.000e+00	6.534e+06	16	107	0.000e+00	9.333e+05
16	108	0.000e+00	2.783e+05	16	110	3.395e−04	1.540e+08	16	112	6.815e−02	4.351e+10
16	113	3.585e−02	1.637e+10	16	114	3.925e−02	1.794e+10	16	115	1.213e+00	4.319e+11
16	118	5.840e−03	3.773e+09	16	120	4.812e−03	3.112e+09	16	121	1.042e−04	4.815e+07
16	123	3.431e−02	2.243e+10	16	124	3.679e−01	1.721e+11	16	127	9.661e−03	3.581e+09
16	128	3.821e−03	2.551e+09	16	132	9.757e−05	6.536e+07	16	136	2.005e−04	7.556e+07

(continued on next page)

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
16	138	0.000e+00	1.971e+07	16	139	3.054e−03	1.161e+09	16	140	0.000e+00	3.031e+07
16	141	0.000e+00	4.055e+08	16	143	0.000e+00	2.334e+07	16	144	0.000e+00	5.294e+07
16	145	0.000e+00	5.429e+06	16	146	0.000e+00	1.183e+06	16	148	0.000e+00	5.086e+07
16	149	0.000e+00	1.631e+08	16	150	0.000e+00	3.278e+06	16	151	0.000e+00	4.963e+06
16	152	0.000e+00	1.590e+07	16	154	0.000e+00	2.285e+06	16	155	0.000e+00	7.920e+06
16	157	0.000e+00	1.570e+06	16	159	0.000e+00	3.720e+06	17	27	6.902e−02	2.101e+09
17	28	5.853e−03	1.287e+08	17	30	8.432e−01	3.015e+10	17	32	4.615e−02	2.781e+09
17	33	8.943e−02	3.269e+09	17	38	0.000e+00	3.734e+04	17	39	0.000e+00	5.514e+04
17	42	1.629e−03	7.195e+08	17	46	0.000e+00	7.849e+06	17	47	0.000e+00	1.074e+06
17	48	0.000e+00	1.302e+05	17	49	0.000e+00	1.367e+07	17	53	0.000e+00	2.706e+05
17	54	1.651e−02	8.771e+09	17	55	1.312e−01	7.143e+10	17	56	2.380e−04	7.793e+07
17	58	1.495e−02	8.345e+09	17	60	1.567e−02	5.314e+09	17	61	2.251e−03	1.277e+09
17	62	4.622e−02	1.612e+10	17	64	0.000e+00	3.858e+05	17	65	0.000e+00	3.369e+05
17	66	0.000e+00	1.108e+07	17	67	0.000e+00	1.917e+06	17	68	0.000e+00	5.185e+06
17	69	0.000e+00	2.573e+05	17	70	0.000e+00	5.961e+04	17	71	0.000e+00	1.070e+07
17	72	0.000e+00	3.062e+05	17	73	0.000e+00	4.668e+06	17	74	0.000e+00	9.342e+05
17	75	0.000e+00	8.926e+06	17	76	1.849e−01	5.759e+10	17	77	2.737e+00	8.611e+11
17	79	4.785e−03	2.118e+09	17	80	1.256e+00	4.041e+11	17	83	7.077e−03	2.317e+09
17	84	4.545e−02	2.091e+10	17	85	7.192e−03	5.539e+09	17	87	4.246e−01	2.008e+11
17	88	1.824e−02	1.454e+10	17	89	2.890e−04	1.384e+08	17	90	1.349e−02	4.630e+09
17	91	2.199e−01	1.068e+11	17	92	0.000e+00	2.662e+07	17	93	0.000e+00	4.808e+06
17	94	0.000e+00	5.346e+06	17	95	0.000e+00	6.425e+04	17	96	0.000e+00	2.027e+05
17	97	0.000e+00	1.771e+06	17	98	0.000e+00	3.864e+06	17	99	1.570e−04	1.449e+08
17	100	0.000e+00	2.295e+06	17	101	0.000e+00	4.998e+06	17	102	0.000e+00	9.516e+06
17	104	0.000e+00	3.237e+07	17	105	0.000e+00	1.696e+07	17	106	0.000e+00	2.779e+04
17	107	0.000e+00	5.776e+05	17	109	0.000e+00	1.958e+06	17	110	5.131e−01	2.299e+11
17	111	4.453e−04	4.673e+08	17	112	1.031e−02	6.500e+09	17	113	8.821e−02	3.980e+10
17	114	1.498e−01	6.763e+10	17	116	1.356e−01	1.434e+11	17	118	1.527e−02	9.747e+09
17	119	5.816e−03	6.188e+09	17	120	2.825e−02	1.805e+10	17	121	1.570e−04	7.167e+07
17	122	6.251e−03	6.702e+09	17	123	3.794e−02	2.450e+10	17	124	9.244e−03	4.272e+09
17	128	1.852e−01	1.222e+11	17	129	1.881e−02	2.069e+10	17	131	0.000e+00	9.769e+04
17	132	1.418e−01	9.389e+10	17	134	0.000e+00	7.664e+06	17	138	0.000e+00	3.271e+07
17	140	0.000e+00	2.187e+08	17	143	0.000e+00	7.012e+06	17	144	0.000e+00	1.287e+06
17	146	0.000e+00	1.536e+08	17	148	0.000e+00	1.722e+07	17	149	0.000e+00	9.056e+05
17	151	0.000e+00	8.782e+06	17	152	0.000e+00	5.809e+06	17	153	0.000e+00	1.681e+07
17	154	0.000e+00	5.708e+06	17	155	0.000e+00	2.629e+07	17	156	0.000e+00	4.044e+07
17	157	0.000e+00	2.187e+08	17	158	0.000e+00	5.838e+07	18	28	6.610e−02	1.429e+09
18	29	9.986e−01	1.701e+10	18	34	1.934e−03	3.893e+07	18	40	0.000e+00	2.001e+05
18	44	2.680e−02	5.067e+09	18	48	0.000e+00	1.759e+07	18	59	4.106e−01	9.834e+10
18	66	0.000e+00	8.307e+05	18	67	0.000e+00	1.405e+06	18	68	0.000e+00	2.440e+06
18	69	0.000e+00	2.164e+07	18	70	0.000e+00	2.645e+07	18	71	0.000e+00	7.418e+05
18	72	0.000e+00	4.463e+06	18	78	6.997e−04	1.705e+08	18	80	1.645e−02	5.267e+09
18	81	7.329e+00	1.498e+12	18	82	1.015e+00	2.537e+11	18	83	1.125e−01	3.667e+10
18	90	4.329e−01	1.479e+11	18	92	0.000e+00	1.802e+05	18	94	0.000e+00	2.081e+07
18	95	0.000e+00	3.455e+07	18	96	0.000e+00	4.976e+06	18	97	0.000e+00	1.145e+07
18	98	0.000e+00	1.878e+07	18	101	0.000e+00	5.896e+07	18	104	0.000e+00	8.182e+05
18	108	0.000e+00	1.019e+06	18	110	2.437e−03	1.088e+09	18	113	4.975e−02	2.237e+10
18	114	2.420e−02	1.089e+10	18	115	7.596e−02	2.662e+10	18	117	1.653e+00	4.754e+11
18	121	1.484e−02	6.747e+09	18	124	3.503e−02	1.613e+10	18	125	4.752e−01	1.705e+11
18	127	1.105e−03	4.035e+08	18	137	3.789e−04	1.151e+08	18	138	0.000e+00	1.678e+05
18	140	0.000e+00	2.284e+06	18	141	0.000e+00	4.047e+07	18	142	0.000e+00	4.514e+08
18	143	0.000e+00	8.514e+05	18	144	0.000e+00	1.448e+07	18	145	0.000e+00	5.503e+07
18	148	0.000e+00	2.374e+06	18	149	0.000e+00	3.973e+07	18	150	0.000e+00	1.834e+08
18	152	0.000e+00	1.618e+06	18	153	0.000e+00	1.468e+07	18	154	0.000e+00	4.564e+06
19	27	6.614e−01	1.714e+10	19	30	2.522e−02	7.777e+08	19	31	2.958e−01	4.596e+10
19	32	5.963e−04	3.101e+07	19	33	2.660e−02	8.400e+08	19	35	5.593e−03	1.270e+09
19	47	0.000e+00	6.502e+06	19	49	0.000e+00	4.356e+05	19	54	1.988e−02	1.006e+10
19	55	1.847e−04	9.590e+07	19	56	5.265e−03	1.644e+09	19	57	5.834e−02	9.160e+10
19	58	2.033e−02	1.083e+10	19	61	6.777e−03	3.670e+09	19	63	4.549e−04	7.909e+08
19	64	0.000e+00	4.384e+06	19	65	0.000e+00	1.088e+07	19	66	0.000e+00	1.356e+06
19	67	0.000e+00	8.235e+05	19	68	0.000e+00	3.532e+06	19	72	0.000e+00	2.939e+06
19	73	0.000e+00	8.765e+04	19	75	0.000e+00	4.437e+05	19	79	2.492e+00	1.059e+12
19	84	2.190e−01	9.682e+10	19	85	2.821e−03	2.088e+09	19	87	6.003e−02	2.730e+10
19	88	6.222e−02	4.769e+10	19	89	5.114e−02	2.355e+10	19	91	1.205e−04	5.629e+07
19	92	0.000e+00	3.311e+05	19	93	0.000e+00	1.831e+06	19	94	0.000e+00	5.725e+05
19	95	0.000e+00	6.667e+06	19	96	0.000e+00	1.917e+07	19	97	0.000e+00	2.380e+07
19	99	4.038e−04	3.592e+08	19	100	0.000e+00	6.339e+06	19	101	0.000e+00	3.517e+06
19	104	0.000e+00	8.696e+05	19	107	0.000e+00	6.072e+04	19	108	0.000e+00	7.754e+04
19	111	3.232e−01	3.277e+11	19	112	6.399e−04	3.900e+08	19	116	8.366e−04	8.551e+08
19	118	6.427e−04	3.966e+08	19	119	2.258e−02	2.322e+10	19	120	4.419e−03	2.729e+09
19	122	4.434e−02	4.595e+10	19	123	4.418e−01	2.758e+11	19	126	1.166e−01	3.717e+11
19	128	2.035e−02	1.298e+10	19	130	0.000e+00	1.273e+06	19	132	3.533e−03	2.262e+09
19	134	0.000e+00	8.029e+04	19	143	0.000e+00	1.956e+08	19	144	0.000e+00	5.595e+06
19	147	7.452e−04	2.496e+09	19	148	0.000e+00	1.342e+08	19	151	0.000e+00	2.344e+08

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
19	152	0.000e+00	5.988e+06	19	153	0.000e+00	4.253e+06	19	154	0.000e+00	2.770e+07
19	155	0.000e+00	3.459e+07	19	158	0.000e+00	1.969e+06	20	27	4.046e−02	1.037e+09
20	28	6.317e−01	1.171e+10	20	30	4.267e−03	1.303e+08	20	32	5.502e−01	2.833e+10
20	33	3.182e−01	9.951e+09	20	42	1.867e−04	7.792e+07	20	44	5.529e−04	9.935e+07
20	46	0.000e+00	1.278e+07	20	47	0.000e+00	4.229e+06	20	48	0.000e+00	1.268e+05
20	49	0.000e+00	3.418e+06	20	52	0.000e+00	1.996e+05	20	54	4.236e−04	2.137e+08
20	55	2.700e−02	1.397e+10	20	56	2.200e−02	6.846e+09	20	58	1.135e−01	6.026e+10
20	59	2.213e−03	5.067e+08	20	60	7.757e−04	2.503e+08	20	61	1.724e−02	9.308e+09
20	62	8.885e−03	2.949e+09	20	64	0.000e+00	9.436e+05	20	65	0.000e+00	9.387e+06
20	66	0.000e+00	1.092e+07	20	67	0.000e+00	2.190e+06	20	68	0.000e+00	8.962e+05
20	69	0.000e+00	3.006e+05	20	70	0.000e+00	2.778e+04	20	71	0.000e+00	4.222e+06
20	72	0.000e+00	5.241e+06	20	73	0.000e+00	9.677e+04	20	74	0.000e+00	5.669e+04
20	75	0.000e+00	4.520e+06	20	76	2.846e−02	8.486e+09	20	77	1.337e+00	4.026e+11
20	79	2.393e−01	1.014e+11	20	80	1.976e+00	6.089e+11	20	83	1.021e+00	3.201e+11
20	84	4.100e−03	1.807e+09	20	85	6.868e−03	5.069e+09	20	87	7.728e−02	3.505e+10
20	88	2.757e−02	2.108e+10	20	89	5.532e−02	2.541e+10	20	90	7.826e−02	2.575e+10
20	91	7.002e−03	3.263e+09	20	92	0.000e+00	7.845e+06	20	93	0.000e+00	7.609e+06
20	94	0.000e+00	4.456e+04	20	95	0.000e+00	4.850e+06	20	96	0.000e+00	1.868e+06
20	97	0.000e+00	1.420e+07	20	98	0.000e+00	3.699e+07	20	99	1.386e−03	1.231e+09
20	100	0.000e+00	3.342e+05	20	101	0.000e+00	2.541e+06	20	102	0.000e+00	1.142e+07
20	104	0.000e+00	9.578e+05	20	105	0.000e+00	6.654e+05	20	106	0.000e+00	6.847e+05
20	107	0.000e+00	1.678e+05	20	108	0.000e+00	1.329e+05	20	109	0.000e+00	2.038e+05
20	110	2.319e−02	1.002e+10	20	111	4.985e−02	5.044e+10	20	112	3.622e−01	2.203e+11
20	113	8.271e−03	3.599e+09	20	114	9.619e−02	4.188e+10	20	118	2.717e−02	1.673e+10
20	119	3.536e−03	3.629e+09	20	120	4.203e−03	2.590e+09	20	122	1.472e−01	1.522e+11
20	123	3.442e−02	2.144e+10	20	124	4.171e−01	1.860e+11	20	128	5.245e−02	3.339e+10
20	129	2.380e−01	2.525e+11	20	130	0.000e+00	4.472e+05	20	131	0.000e+00	8.821e+05
20	132	1.032e−01	6.590e+10	20	133	0.000e+00	1.858e+05	20	134	0.000e+00	6.656e+05
20	138	0.000e+00	1.084e+06	20	140	0.000e+00	1.818e+07	20	143	0.000e+00	5.757e+07
20	144	0.000e+00	1.393e+08	20	145	0.000e+00	8.044e+06	20	146	0.000e+00	2.411e+06
20	148	0.000e+00	1.619e+07	20	149	0.000e+00	9.687e+07	20	151	0.000e+00	7.076e+07
20	152	0.000e+00	1.137e+08	20	153	0.000e+00	1.664e+07	20	154	0.000e+00	8.437e+07
20	155	0.000e+00	2.448e+08	20	156	0.000e+00	3.443e+08	20	157	0.000e+00	1.485e+07
20	158	0.000e+00	3.752e+06	21	27	7.475e−04	1.782e+07	21	28	7.849e−02	1.354e+09
21	29	1.870e+00	2.546e+10	21	30	1.332e−01	3.805e+09	21	33	2.966e−01	8.687e+09
21	34	8.282e−03	1.357e+08	21	43	8.432e−04	2.068e+08	21	45	4.153e−04	1.024e+08
21	47	0.000e+00	2.919e+06	21	48	0.000e+00	7.735e+06	21	49	0.000e+00	1.444e+05
21	56	1.268e−02	3.866e+09	21	59	7.306e−02	1.639e+10	21	60	1.389e−01	4.391e+10
21	62	1.695e−02	5.515e+09	21	64	0.000e+00	1.106e+06	21	65	0.000e+00	1.279e+05
21	66	0.000e+00	6.644e+05	21	67	0.000e+00	5.333e+06	21	68	0.000e+00	1.754e+06
21	69	0.000e+00	7.217e+05	21	70	0.000e+00	9.788e+06	21	71	0.000e+00	3.052e+05
21	72	0.000e+00	1.042e+07	21	73	0.000e+00	7.671e+06	21	75	0.000e+00	1.974e+06
21	76	3.366e−02	9.859e+09	21	77	5.711e−03	1.690e+09	21	78	1.091e+00	2.511e+11
21	79	6.010e−04	2.502e+08	21	80	1.689e−01	5.114e+10	21	82	3.860e+00	9.125e+11
21	83	1.066e+00	3.285e+11	21	84	1.347e−01	5.835e+10	21	86	7.895e−03	1.940e+09
21	87	3.228e−03	1.439e+09	21	89	7.150e−02	3.229e+10	21	90	2.699e−01	8.735e+10
21	91	8.789e−05	4.027e+07	21	92	0.000e+00	2.802e+06	21	93	0.000e+00	7.793e+06
21	94	0.000e+00	2.058e+07	21	95	0.000e+00	3.928e+07	21	96	0.000e+00	4.827e+06
21	97	0.000e+00	3.270e+05	21	98	0.000e+00	3.978e+07	21	100	0.000e+00	1.334e+07
21	101	0.000e+00	3.320e+06	21	104	0.000e+00	1.665e+06	21	107	0.000e+00	3.037e+04
21	110	5.566e−02	2.370e+10	21	112	6.026e−02	3.611e+10	21	113	3.064e−01	1.314e+11
21	114	2.919e−01	1.252e+11	21	115	3.626e−02	1.212e+10	21	118	2.605e−03	1.580e+09
21	120	4.458e−03	2.708e+09	21	121	9.476e−02	4.111e+10	21	123	1.220e−03	7.493e+08
21	124	7.576e−02	3.329e+10	21	125	1.303e+00	4.464e+11	21	127	9.618e−04	3.351e+08
21	128	1.170e−01	7.342e+10	21	131	0.000e+00	3.182e+05	21	132	4.694e−02	2.956e+10
21	133	0.000e+00	8.969e+05	21	138	0.000e+00	7.259e+06	21	139	2.564e−03	9.169e+08
21	140	0.000e+00	1.362e+06	21	141	0.000e+00	9.685e+06	21	143	0.000e+00	4.033e+06
21	144	0.000e+00	4.903e+07	21	145	0.000e+00	1.970e+08	21	146	0.000e+00	1.167e+06
21	148	0.000e+00	5.614e+05	21	149	0.000e+00	2.651e+07	21	150	0.000e+00	2.367e+08
21	151	0.000e+00	2.928e+06	21	152	0.000e+00	2.856e+07	21	153	0.000e+00	1.313e+08
21	154	0.000e+00	7.059e+07	21	155	0.000e+00	3.334e+07	21	157	0.000e+00	2.665e+05
21	159	0.000e+00	1.847e+06	22	32	2.741e−01	1.311e+10	22	48	0.000e+00	1.448e+06
22	50	0.000e+00	1.533e+05	22	54	1.062e−04	5.236e+07	22	55	2.360e−04	1.194e+08
22	58	6.395e−03	3.320e+09	22	61	3.546e−02	1.872e+10	22	66	0.000e+00	5.316e+05
22	68	0.000e+00	2.287e+06	22	72	0.000e+00	4.650e+06	22	85	9.827e−01	7.115e+11
22	88	5.639e−04	4.230e+08	22	92	0.000e+00	3.537e+06	22	94	0.000e+00	5.678e+05
22	96	0.000e+00	1.639e+07	22	99	5.916e−04	5.160e+08	22	101	0.000e+00	4.358e+05
22	108	0.000e+00	1.741e+05	22	111	9.627e−02	9.582e+10	22	116	1.500e−02	1.505e+10
22	119	2.638e−03	2.664e+09	22	122	7.099e−02	7.223e+10	22	129	1.201e−01	1.254e+11
22	130	0.000e+00	6.044e+05	22	143	0.000e+00	5.250e+07	22	146	0.000e+00	2.681e+06
22	152	0.000e+00	1.216e+08	22	154	0.000e+00	2.418e+07	23	27	1.940e−01	4.578e+09
23	30	9.599e−02	2.717e+09	23	31	8.985e−02	1.282e+10	23	32	2.826e−01	1.350e+10
23	33	2.071e−01	6.008e+09	23	42	1.942e−04	7.898e+07	23	48	0.000e+00	4.285e+06
23	51	0.000e+00	1.550e+05	23	55	2.374e−03	1.200e+09	23	56	8.491e−04	2.582e+08

(continued on next page)

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
23	57	1.246e−04	1.906e+08	23	58	1.556e−02	8.075e+09	23	60	2.172e−02	6.849e+09
23	61	7.852e−02	4.143e+10	23	62	2.296e−03	7.452e+08	23	65	0.000e+00	7.356e+05
23	66	0.000e+00	3.910e+05	23	67	0.000e+00	2.623e+05	23	68	0.000e+00	1.530e+06
23	69	0.000e+00	5.513e+06	23	71	0.000e+00	2.638e+05	23	72	0.000e+00	4.220e+06
23	73	0.000e+00	8.824e+06	23	75	0.000e+00	2.225e+06	23	79	1.059e−01	4.398e+10
23	84	1.757e+00	7.596e+11	23	85	1.024e+00	7.410e+11	23	87	1.379e−02	6.134e+09
23	88	2.798e−02	2.099e+10	23	89	1.180e−03	5.316e+08	23	92	0.000e+00	1.022e+07
23	93	0.000e+00	1.728e+07	23	94	0.000e+00	7.135e+06	23	95	0.000e+00	1.342e+06
23	96	0.000e+00	2.200e+07	23	97	0.000e+00	7.318e+06	23	99	1.352e−03	1.179e+09
23	100	0.000e+00	6.069e+06	23	107	0.000e+00	1.420e+05	23	108	0.000e+00	3.112e+05
23	111	9.266e−05	9.220e+07	23	112	3.345e−01	2.000e+11	23	116	3.244e−03	3.254e+09
23	118	6.013e−03	3.641e+09	23	119	3.902e−03	3.939e+09	23	120	7.363e−03	4.462e+09
23	122	1.615e−01	1.643e+11	23	123	1.306e−01	8.001e+10	23	126	4.805e−02	1.504e+11
23	128	9.776e−02	6.123e+10	23	129	1.167e−01	1.218e+11	23	131	0.000e+00	1.075e+06
23	132	3.596e−02	2.260e+10	23	143	0.000e+00	1.082e+05	23	144	0.000e+00	1.299e+08
23	146	0.000e+00	8.004e+05	23	147	3.951e−05	1.300e+08	23	148	0.000e+00	3.125e+07
23	151	0.000e+00	7.990e+07	23	152	0.000e+00	1.337e+08	23	153	0.000e+00	7.279e+07
23	154	0.000e+00	7.719e+07	23	155	0.000e+00	1.352e+07	23	157	0.000e+00	2.324e+05
23	158	0.000e+00	1.771e+05	24	27	5.953e−02	1.401e+09	24	28	6.629e−01	1.128e+10
24	30	1.324e−01	3.740e+09	24	32	2.861e−03	1.363e+08	24	33	6.833e−01	1.978e+10
24	46	0.000e+00	1.094e+05	24	47	0.000e+00	3.466e+05	24	48	0.000e+00	6.625e+06
24	49	0.000e+00	3.312e+05	24	52	0.000e+00	1.430e+05	24	54	1.904e−03	9.372e+08
24	56	4.274e−03	1.299e+09	24	58	1.050e−03	5.442e+08	24	59	7.734e−03	1.729e+09
24	60	8.599e−02	2.709e+10	24	61	7.549e−02	3.980e+10	24	62	1.385e−02	4.490e+09
24	64	0.000e+00	1.553e+05	24	67	0.000e+00	1.395e+06	24	68	0.000e+00	1.355e+06
24	69	0.000e+00	9.702e+06	24	70	0.000e+00	2.899e+06	24	73	0.000e+00	6.747e+06
24	74	0.000e+00	3.189e+07	24	75	0.000e+00	3.549e+06	24	76	3.167e−02	9.247e+09
24	77	1.759e−01	5.189e+10	24	79	2.562e−02	1.063e+10	24	80	3.642e−01	1.099e+11
24	83	2.624e+00	8.064e+11	24	84	1.306e+00	5.640e+11	24	85	1.507e−01	1.090e+11
24	87	5.806e−02	2.581e+10	24	88	2.422e−02	1.815e+10	24	89	7.804e−02	3.514e+10
24	90	1.558e−03	5.027e+08	24	91	9.407e−03	4.297e+09	24	92	0.000e+00	6.307e+06
24	93	0.000e+00	2.451e+07	24	94	0.000e+00	2.689e+07	24	95	0.000e+00	1.892e+07
24	96	0.000e+00	4.995e+05	24	97	0.000e+00	1.695e+07	24	98	0.000e+00	3.791e+06
24	99	1.401e−03	1.221e+09	24	100	0.000e+00	5.866e+04	24	101	0.000e+00	4.758e+06
24	102	0.000e+00	1.772e+07	24	104	0.000e+00	5.297e+04	24	105	0.000e+00	1.344e+06
24	106	0.000e+00	2.628e+05	24	107	0.000e+00	2.459e+05	24	108	0.000e+00	1.652e+05
24	109	0.000e+00	1.113e+05	24	110	5.819e−03	2.471e+09	24	111	2.030e−02	2.018e+10
24	112	6.799e−02	4.064e+10	24	113	2.953e−01	1.263e+11	24	114	1.663e−01	7.118e+10
24	116	3.481e−04	3.490e+08	24	118	9.176e−03	5.554e+09	24	119	3.007e−03	3.033e+09
24	120	7.865e−03	4.764e+09	24	121	2.901e−02	1.255e+10	24	122	1.609e−01	1.636e+11
24	123	4.914e−02	3.009e+10	24	124	4.505e−01	1.974e+11	24	128	1.982e−01	1.241e+11
24	129	5.727e−03	5.976e+09	24	130	0.000e+00	9.514e+04	24	132	1.631e−01	1.025e+11
24	133	0.000e+00	1.117e+06	24	138	0.000e+00	3.353e+05	24	140	0.000e+00	1.818e+06
24	143	0.000e+00	2.348e+07	24	144	0.000e+00	1.921e+07	24	145	0.000e+00	1.482e+08
24	146	0.000e+00	1.298e+06	24	148	0.000e+00	2.386e+07	24	149	0.000e+00	9.131e+07
24	151	0.000e+00	1.652e+07	24	152	0.000e+00	1.438e+06	24	153	0.000e+00	1.710e+08
24	154	0.000e+00	1.334e+08	24	155	0.000e+00	7.910e+07	24	156	0.000e+00	5.592e+07
24	157	0.000e+00	1.120e+07	24	158	0.000e+00	1.531e+06	25	27	2.027e−03	3.163e+07
25	28	5.580e−03	6.315e+07	25	29	2.097e−03	1.880e+07	25	30	1.270e−01	2.472e+09
25	33	7.656e−02	1.536e+09	25	34	2.384e+00	2.680e+10	25	39	0.000e+00	2.590e+05
25	41	0.000e+00	7.061e+05	25	43	2.330e−03	5.052e+08	25	45	5.058e−02	1.103e+10
25	47	0.000e+00	3.582e+05	25	49	0.000e+00	8.037e+06	25	53	0.000e+00	4.799e+05
25	56	4.143e−04	1.132e+08	25	59	1.467e−04	2.954e+07	25	60	1.092e−02	3.101e+09
25	62	1.142e−01	3.341e+10	25	64	0.000e+00	3.777e+06	25	66	0.000e+00	9.602e+05
25	67	0.000e+00	1.172e+06	25	68	0.000e+00	3.849e+06	25	69	0.000e+00	8.930e+05
25	71	0.000e+00	9.963e+06	25	72	0.000e+00	1.480e+06	25	73	0.000e+00	5.949e+04
25	75	0.000e+00	4.546e+05	25	76	1.412e−01	3.762e+10	25	77	1.513e−01	4.078e+10
25	78	1.094e−01	2.293e+10	25	79	1.360e−03	5.156e+08	25	80	1.785e−01	4.925e+10
25	82	3.707e−03	7.989e+08	25	83	6.594e−02	1.854e+10	25	84	4.969e−04	1.965e+08
25	86	5.236e+00	1.175e+12	25	87	4.289e−02	1.747e+10	25	89	2.333e−02	9.631e+09
25	90	3.716e−03	1.099e+09	25	91	4.669e−01	1.957e+11	25	92	0.000e+00	4.568e+07
25	93	0.000e+00	2.315e+06	25	94	0.000e+00	1.069e+07	25	95	0.000e+00	1.636e+06
25	96	0.000e+00	7.154e+06	25	97	0.000e+00	4.982e+05	25	98	0.000e+00	5.430e+05
25	100	0.000e+00	3.286e+06	25	101	0.000e+00	7.695e+05	25	104	0.000e+00	3.064e+07
25	105	0.000e+00	8.709e+07	25	107	0.000e+00	9.690e+04	25	109	0.000e+00	9.111e+05
25	110	5.102e−01	2.009e+11	25	112	2.133e−03	1.183e+09	25	113	8.136e−03	3.228e+09
25	114	5.680e−02	2.255e+10	25	115	1.040e−02	3.216e+09	25	118	8.887e−03	4.991e+09
25	120	6.697e−03	3.765e+09	25	121	2.552e−03	1.025e+09	25	123	8.264e−04	4.699e+08
25	124	2.883e−03	1.173e+09	25	125	5.440e−04	1.726e+08	25	127	1.505e+00	4.862e+11
25	128	7.695e−03	4.476e+09	25	132	3.934e−02	2.297e+10	25	134	0.000e+00	8.183e+06
25	138	0.000e+00	9.954e+07	25	139	6.991e−01	2.319e+11	25	140	0.000e+00	7.258e+07
25	141	0.000e+00	1.954e+06	25	143	0.000e+00	1.217e+06	25	144	0.000e+00	1.254e+06
25	145	0.000e+00	7.097e+06	25	146	0.000e+00	1.522e+07	25	148	0.000e+00	1.304e+06
25	149	0.000e+00	7.273e+05	25	150	0.000e+00	5.704e+05	25	152	0.000e+00	3.881e+05

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
25	154	0.000e+00	1.109e+06	25	155	0.000e+00	4.041e+05	25	157	0.000e+00	5.281e+07
25	158	0.000e+00	9.612e+05	25	159	0.000e+00	3.651e+08	26	27	2.044e−03	2.914e+07
26	30	3.720e−01	6.682e+09	26	31	1.904e−03	1.727e+08	26	33	1.561e−01	2.892e+09
26	35	4.653e−01	6.847e+10	26	37	2.611e−04	1.671e+08	26	45	8.010e−04	1.706e+08
26	47	0.000e+00	2.151e+05	26	49	0.000e+00	4.692e+06	26	53	0.000e+00	1.178e+06
26	54	7.791e−03	3.370e+09	26	55	7.675e−03	3.413e+09	26	57	1.048e−03	1.411e+09
26	58	7.412e−03	3.388e+09	26	60	3.049e−04	8.476e+07	26	61	3.087e−03	1.436e+09
26	62	2.472e−03	7.088e+08	26	63	5.926e−02	8.903e+10	26	64	0.000e+00	1.449e+06
26	65	0.000e+00	6.654e+05	26	66	0.000e+00	3.114e+05	26	67	0.000e+00	2.163e+05
26	68	0.000e+00	2.150e+06	26	69	0.000e+00	1.261e+05	26	71	0.000e+00	1.146e+06
26	72	0.000e+00	7.632e+05	26	73	0.000e+00	3.917e+06	26	75	0.000e+00	1.205e+07
26	79	3.336e−02	1.242e+10	26	84	3.597e−02	1.397e+10	26	87	2.727e+00	1.092e+12
26	88	1.258e−03	8.498e+08	26	89	1.869e−02	7.584e+09	26	91	6.748e−02	2.780e+10
26	92	0.000e+00	6.448e+06	26	93	0.000e+00	9.133e+04	26	94	0.000e+00	1.647e+06
26	95	0.000e+00	1.322e+06	26	96	0.000e+00	2.766e+05	26	97	0.000e+00	9.202e+04
26	101	0.000e+00	5.786e+05	26	104	0.000e+00	4.080e+07	26	105	0.000e+00	1.387e+06
26	107	0.000e+00	6.226e+04	26	109	0.000e+00	1.260e+06	26	111	1.483e−02	1.348e+10
26	116	4.931e−01	4.519e+11	26	118	9.512e−05	5.265e+07	26	119	7.599e−03	7.010e+09
26	122	1.577e−02	1.467e+10	26	123	1.860e−03	1.042e+09	26	126	9.830e−04	2.816e+09
26	128	1.408e−01	8.072e+10	26	129	1.314e−04	1.256e+08	26	132	3.231e−01	1.859e+11
26	134	0.000e+00	2.548e+06	26	143	0.000e+00	3.328e+05	26	146	0.000e+00	2.232e+08
26	147	1.439e−01	4.342e+11	26	148	0.000e+00	3.420e+05	26	151	0.000e+00	8.341e+05
26	153	0.000e+00	4.432e+05	26	154	0.000e+00	2.773e+06	26	157	0.000e+00	8.265e+07
26	158	0.000e+00	3.294e+08	27	57	0.000e+00	1.378e+05	27	58	0.000e+00	5.433e+04
27	65	9.234e−03	3.215e+09	27	66	1.281e−03	2.679e+08	27	68	4.988e−04	1.084e+08
27	73	1.140e−03	4.232e+08	27	85	0.000e+00	4.391e+05	27	88	0.000e+00	1.422e+07
27	89	0.000e+00	6.201e+06	27	90	0.000e+00	4.342e+05	27	92	6.388e−02	2.004e+10
27	93	2.068e−01	1.090e+11	27	94	1.175e−01	3.723e+10	27	95	1.541e−02	3.500e+09
27	96	1.465e−02	4.665e+09	27	97	4.522e−03	1.034e+09	27	100	4.101e−03	2.222e+09
27	101	1.301e−03	4.232e+08	27	104	7.395e−04	1.752e+08	27	105	5.951e−04	3.308e+08
27	110	0.000e+00	1.384e+06	27	111	0.000e+00	1.705e+07	27	112	0.000e+00	7.556e+06
27	113	0.000e+00	5.787e+06	27	114	0.000e+00	1.201e+07	27	115	0.000e+00	2.913e+06
27	116	0.000e+00	6.297e+05	27	118	0.000e+00	4.736e+05	27	119	0.000e+00	1.915e+06
27	120	0.000e+00	4.254e+05	27	121	0.000e+00	8.798e+04	27	123	0.000e+00	1.909e+06
27	124	0.000e+00	7.952e+05	27	126	0.000e+00	3.100e+07	27	128	0.000e+00	6.135e+05
27	129	0.000e+00	9.651e+06	27	130	9.919e−03	4.051e+09	27	131	1.534e−03	4.474e+08
27	132	0.000e+00	1.932e+05	27	134	1.946e−03	5.710e+08	27	135	0.000e+00	2.750e+05
27	136	0.000e+00	4.569e+04	27	140	0.000e+00	3.635e+04	27	143	1.772e+00	7.518e+11
27	144	3.397e−01	1.031e+11	27	146	1.064e−02	4.579e+09	27	147	0.000e+00	9.618e+04
27	148	6.642e+00	2.074e+12	27	151	1.609e−01	1.181e+11	27	152	1.432e−02	6.310e+09
27	153	9.240e−03	2.909e+09	27	154	2.278e−03	1.009e+09	27	155	9.244e−03	6.829e+09
27	157	3.457e−03	1.103e+09	28	55	0.000e+00	4.505e+04	28	58	0.000e+00	4.796e+04
28	60	0.000e+00	4.383e+04	28	64	1.732e−04	3.600e+07	28	66	9.883e−03	2.059e+09
28	67	8.546e−04	1.276e+08	28	68	3.766e−03	8.149e+08	28	69	1.157e−03	1.794e+08
28	72	1.532e−03	3.392e+08	28	84	0.000e+00	1.624e+05	28	85	0.000e+00	2.211e+05
28	88	0.000e+00	7.122e+06	28	89	0.000e+00	1.042e+07	28	90	0.000e+00	4.693e+06
28	91	0.000e+00	3.310e+05	28	92	4.057e−04	1.268e+08	28	94	1.111e−01	3.509e+10
28	95	2.219e−01	5.022e+10	28	96	2.097e−01	6.657e+10	28	97	2.132e−02	4.861e+09
28	98	1.932e−02	3.444e+09	28	101	7.595e−03	2.463e+09	28	104	1.850e−03	4.367e+08
28	111	0.000e+00	7.803e+06	28	112	0.000e+00	1.299e+07	28	113	0.000e+00	1.110e+07
28	115	0.000e+00	1.707e+07	28	116	0.000e+00	4.458e+05	28	117	0.000e+00	2.452e+06
28	118	0.000e+00	9.099e+05	28	119	0.000e+00	9.037e+05	28	120	0.000e+00	5.684e+05
28	121	0.000e+00	7.898e+05	28	123	0.000e+00	1.178e+06	28	124	0.000e+00	1.455e+06
28	125	0.000e+00	7.151e+05	28	128	0.000e+00	3.488e+06	28	129	0.000e+00	2.076e+07
28	130	1.178e−03	4.798e+08	28	131	1.183e−02	3.442e+09	28	132	0.000e+00	2.237e+06
28	133	1.484e−03	3.357e+08	28	135	0.000e+00	7.845e+04	28	136	0.000e+00	2.741e+05
28	137	0.000e+00	4.206e+04	28	138	3.807e−03	8.845e+08	28	140	2.751e−02	6.409e+09
28	141	0.000e+00	1.603e+04	28	143	1.967e−01	8.323e+10	28	144	2.245e+00	6.792e+11
28	145	3.525e−01	8.308e+10	28	146	5.125e−03	2.199e+09	28	148	6.988e−01	2.175e+11
28	149	8.746e+00	2.122e+12	28	152	2.375e−01	1.043e+11	28	153	5.115e−03	1.606e+09
28	154	3.389e−02	1.496e+10	28	157	1.007e−02	3.205e+09	29	56	0.000e+00	3.569e+04
29	59	0.000e+00	4.921e+04	29	60	0.000e+00	8.283e+04	29	67	1.126e−02	1.672e+09
29	69	1.109e−02	1.711e+09	29	89	0.000e+00	4.581e+06	29	90	0.000e+00	1.669e+07
29	95	1.109e−01	2.500e+10	29	97	3.515e−01	7.980e+10	29	98	2.879e−01	5.111e+10
29	104	1.463e−03	3.439e+08	29	110	0.000e+00	1.482e+06	29	112	0.000e+00	5.065e+06
29	113	0.000e+00	7.811e+06	29	114	0.000e+00	9.972e+06	29	115	0.000e+00	4.480e+06
29	117	0.000e+00	2.193e+07	29	118	0.000e+00	2.600e+05	29	120	0.000e+00	3.127e+05
29	121	0.000e+00	2.658e+06	29	124	0.000e+00	9.644e+05	29	125	0.000e+00	2.459e+06
29	128	0.000e+00	1.674e+07	29	131	1.082e−03	3.137e+08	29	132	0.000e+00	7.215e+06
29	133	1.613e−02	3.636e+09	29	136	0.000e+00	6.514e+04	29	137	0.000e+00	3.804e+05
29	138	3.408e−02	7.888e+09	29	140	2.789e−02	6.475e+09	29	141	8.553e−03	1.626e+09
29	142	0.000e+00	1.489e+04	29	144	1.937e−01	5.840e+10	29	145	3.149e+00	7.395e+11
29	148	8.664e−03	2.687e+09	29	149	7.284e−01	1.761e+11	29	150	1.161e+01	2.300e+12
29	153	3.942e−01	1.233e+11	29	157	1.812e−03	5.747e+08	29	159	4.959e−03	1.029e+09

(continued on next page)

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
30	47	9.024e-04	1.685e+08	30	49	2.242e-03	4.568e+08	30	54	0.000e+00	7.472e+04
30	55	0.000e+00	5.652e+04	30	63	0.000e+00	1.799e+05	30	64	1.104e-03	2.160e+08
30	65	9.246e-04	3.016e+08	30	67	8.445e-04	1.186e+08	30	68	7.574e-04	1.544e+08
30	71	8.329e-04	1.236e+08	30	72	4.431e-04	9.249e+07	30	73	3.861e-03	1.346e+09
30	75	8.734e-03	3.094e+09	30	76	0.000e+00	1.846e+05	30	77	0.000e+00	1.676e+05
30	80	0.000e+00	1.855e+05	30	84	0.000e+00	1.871e+05	30	86	0.000e+00	2.565e+05
30	88	0.000e+00	7.356e+05	30	89	0.000e+00	2.101e+06	30	90	0.000e+00	1.316e+06
30	91	0.000e+00	9.757e+06	30	92	1.404e-01	4.178e+10	30	93	1.228e-03	6.140e+08
30	94	3.534e-02	1.062e+10	30	95	1.977e-02	4.260e+09	30	96	3.223e-02	9.739e+09
30	97	1.725e-02	3.745e+09	30	100	4.951e-02	2.546e+10	30	101	4.219e-02	1.303e+10
30	103	0.000e+00	4.769e+05	30	104	4.586e-02	1.032e+10	30	105	9.658e-02	5.100e+10
30	107	5.531e-05	3.094e+07	30	108	6.772e-04	2.285e+08	30	109	8.852e-03	5.040e+09
30	110	0.000e+00	1.198e+07	30	111	0.000e+00	2.642e+06	30	112	0.000e+00	1.761e+06
30	113	0.000e+00	9.825e+05	30	114	0.000e+00	7.194e+04	30	116	0.000e+00	1.379e+07
30	119	0.000e+00	6.069e+04	30	120	0.000e+00	3.511e+05	30	121	0.000e+00	9.012e+04
30	122	0.000e+00	1.617e+05	30	123	0.000e+00	2.662e+05	30	124	0.000e+00	6.905e+05
30	125	0.000e+00	3.647e+06	30	126	0.000e+00	7.206e+06	30	127	0.000e+00	3.890e+06
30	128	0.000e+00	2.132e+06	30	129	0.000e+00	5.543e+06	30	132	0.000e+00	2.429e+05
30	134	1.756e-01	4.918e+10	30	139	0.000e+00	4.036e+06	30	143	2.934e-02	1.189e+10
30	144	1.152e-02	3.340e+09	30	146	2.138e+00	8.797e+11	30	147	0.000e+00	6.583e+07
30	148	6.191e-03	1.848e+09	30	152	3.926e-02	1.654e+10	30	153	1.905e+00	5.735e+11
30	154	6.417e-01	2.717e+11	30	155	2.288e-01	1.616e+11	30	157	3.842e+00	1.173e+12
30	158	1.930e-01	1.413e+11	31	47	3.087e-04	5.741e+07	31	79	0.000e+00	2.318e+05
31	84	0.000e+00	2.037e+05	31	89	0.000e+00	2.284e+06	31	91	0.000e+00	3.980e+04
31	93	3.913e-02	1.951e+10	31	100	6.285e-02	3.225e+10	31	105	3.114e-03	1.641e+09
31	107	7.215e-04	4.027e+08	31	112	0.000e+00	3.207e+06	31	118	0.000e+00	2.175e+05
31	123	0.000e+00	5.964e+06	31	128	0.000e+00	3.170e+06	31	132	0.000e+00	1.754e+06
31	151	1.611e+00	1.129e+12	31	155	2.451e-01	1.728e+11	31	158	1.564e-03	1.143e+09
32	46	3.607e-04	1.987e+08	32	47	2.280e-04	4.231e+07	32	48	3.582e-04	4.208e+07
32	74	1.542e-04	1.618e+08	32	77	0.000e+00	2.244e+05	32	84	0.000e+00	1.712e+05
32	85	0.000e+00	1.017e+06	32	88	0.000e+00	5.057e+06	32	89	0.000e+00	5.470e+05
32	90	0.000e+00	2.437e+06	32	92	2.986e-04	8.848e+07	32	93	9.878e-03	4.920e+09
32	94	5.771e-02	1.728e+10	32	96	2.880e-02	8.672e+09	32	100	6.645e-02	3.404e+10
32	101	7.111e-02	2.188e+10	32	102	7.856e-02	1.209e+11	32	105	9.353e-04	4.922e+08
32	106	6.864e-04	1.146e+09	32	107	5.247e-04	2.925e+08	32	108	9.107e-04	3.061e+08
32	110	0.000e+00	9.152e+04	32	111	0.000e+00	6.975e+06	32	112	0.000e+00	1.027e+06
32	113	0.000e+00	1.473e+06	32	114	0.000e+00	1.383e+06	32	116	0.000e+00	5.310e+05
32	119	0.000e+00	5.721e+05	32	120	0.000e+00	6.536e+04	32	121	0.000e+00	2.602e+05
32	123	0.000e+00	5.444e+06	32	124	0.000e+00	8.449e+06	32	128	0.000e+00	8.120e+06
32	129	0.000e+00	6.208e+06	32	132	0.000e+00	3.432e+06	32	143	3.567e-03	1.441e+09
32	146	3.326e-03	1.364e+09	32	151	5.891e-01	4.123e+11	32	152	3.501e+00	1.470e+12
32	154	5.366e-02	2.265e+10	32	155	8.029e-01	5.655e+11	32	156	6.212e-01	1.314e+12
32	158	4.185e-04	3.054e+08	33	48	9.515e-04	1.111e+08	33	49	1.349e-03	2.716e+08
33	63	0.000e+00	4.790e+04	33	64	4.254e-04	8.242e+07	33	66	4.191e-04	8.138e+07
33	68	1.665e-04	3.362e+07	33	73	6.019e-04	2.078e+08	33	75	3.831e-03	1.345e+09
33	83	0.000e+00	6.909e+05	33	84	0.000e+00	4.683e+05	33	85	0.000e+00	2.386e+05
33	86	0.000e+00	1.621e+05	33	87	0.000e+00	1.962e+05	33	88	0.000e+00	1.032e+06
33	89	0.000e+00	2.030e+06	33	90	0.000e+00	3.463e+06	33	91	0.000e+00	4.842e+06
33	92	1.506e-02	4.445e+09	33	93	9.934e-05	4.929e+07	33	94	7.453e-03	2.223e+09
33	95	2.561e-02	5.475e+09	33	96	7.988e-04	2.396e+08	33	97	4.112e-02	8.859e+09
33	100	5.319e-02	2.714e+10	33	101	2.695e-01	8.261e+10	33	103	0.000e+00	1.539e+05
33	104	2.804e-02	6.262e+09	33	105	5.956e-02	3.122e+10	33	107	1.528e-03	8.489e+08
33	108	2.013e-03	6.742e+08	33	109	2.808e-03	1.587e+09	33	110	0.000e+00	1.757e+06
33	111	0.000e+00	5.488e+05	33	112	0.000e+00	3.851e+06	33	113	0.000e+00	2.695e+06
33	114	0.000e+00	4.113e+06	33	116	0.000e+00	6.368e+06	33	118	0.000e+00	2.596e+05
33	119	0.000e+00	3.516e+05	33	120	0.000e+00	5.476e+04	33	121	0.000e+00	6.003e+05
33	122	0.000e+00	1.938e+05	33	123	0.000e+00	4.688e+05	33	124	0.000e+00	3.042e+06
33	125	0.000e+00	8.539e+06	33	126	0.000e+00	1.820e+07	33	127	0.000e+00	1.903e+06
33	128	0.000e+00	3.952e+06	33	129	0.000e+00	1.402e+07	33	132	0.000e+00	3.214e+06
33	134	5.260e-02	1.464e+10	33	139	0.000e+00	1.480e+06	33	143	2.346e-03	9.451e+08
33	144	3.284e-03	9.462e+08	33	146	5.560e-01	2.272e+11	33	147	0.000e+00	2.519e+07
33	148	1.398e-03	4.146e+08	33	151	8.549e-04	5.963e+08	33	152	8.886e-02	3.720e+10
33	153	3.284e+00	9.825e+11	33	154	2.488e+00	1.047e+12	33	155	6.096e-01	4.280e+11
33	157	2.102e+00	6.376e+11	33	158	8.192e-02	5.960e+10	34	56	0.000e+00	4.320e+04
34	60	0.000e+00	1.421e+05	34	62	0.000e+00	1.181e+06	34	67	1.961e-02	2.721e+09
34	69	8.351e-03	1.206e+09	34	71	8.263e-02	1.211e+10	34	86	0.000e+00	5.017e+05
34	89	0.000e+00	5.275e+05	34	91	0.000e+00	2.067e+07	34	95	8.089e-03	1.726e+09
34	97	4.523e-04	9.722e+07	34	98	5.158e-04	8.670e+07	34	104	6.091e-01	1.357e+11
34	110	0.000e+00	2.597e+07	34	113	0.000e+00	7.524e+04	34	114	0.000e+00	2.431e+06
34	118	0.000e+00	5.901e+04	34	120	0.000e+00	4.897e+04	34	121	0.000e+00	4.886e+04
34	123	0.000e+00	7.149e+04	34	125	0.000e+00	9.542e+04	34	127	0.000e+00	3.236e+07
34	128	0.000e+00	4.065e+06	34	132	0.000e+00	9.980e+06	34	134	7.405e-04	2.057e+08
34	138	1.142e+00	2.521e+11	34	139	0.000e+00	8.359e+06	34	140	9.288e-01	2.056e+11
34	141	5.554e-03	1.007e+09	34	142	0.000e+00	3.818e+04	34	144	5.042e-04	1.450e+08

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
34	145	6.124e−02	1.372e+10	34	148	1.712e−03	5.069e+08	34	150	3.241e−03	6.130e+08
34	157	1.733e−01	5.249e+10	34	159	1.350e+01	2.676e+12	35	39	4.153e−04	3.527e+07
35	41	9.539e−04	8.389e+07	35	47	6.998e−04	1.030e+08	35	49	5.357e−03	8.698e+08
35	65	3.511e−04	9.593e+07	35	73	8.893e−04	2.612e+08	35	75	2.348e−03	7.020e+08
35	87	0.000e+00	1.528e+06	35	89	0.000e+00	7.480e+04	35	91	0.000e+00	1.797e+06
35	93	2.203e−03	9.557e+08	35	100	2.771e−03	1.239e+09	35	105	1.192e−01	5.483e+10
35	107	6.049e−04	2.960e+08	35	109	1.048e−02	5.225e+09	35	118	0.000e+00	2.503e+05
35	120	0.000e+00	3.365e+05	35	128	0.000e+00	4.371e+06	35	132	0.000e+00	9.528e+06
35	151	1.268e−03	7.899e+08	35	155	5.595e−04	3.511e+08	35	158	1.937e+00	1.262e+12
36	38	1.622e−01	2.000e+09	36	39	3.582e−01	1.486e+09	36	40	8.874e−01	2.558e+09
36	41	1.425e−01	6.894e+08	36	42	0.000e+00	1.427e+05	36	43	0.000e+00	1.414e+05
36	44	0.000e+00	1.515e+05	36	46	1.331e−01	9.515e+09	36	47	3.573e−01	8.770e+09
36	48	7.185e−01	1.222e+10	36	49	5.360e−02	1.659e+09	36	72	1.714e−03	1.017e+08
36	73	6.480e−04	6.426e+07	36	74	2.941e−04	8.887e+07	36	88	0.000e+00	7.370e+05
36	89	0.000e+00	7.235e+05	36	90	0.000e+00	7.745e+05	36	106	7.429e−02	4.963e+10
36	107	2.105e−01	4.700e+10	36	108	3.380e−01	4.564e+10	36	109	5.543e−03	1.272e+09
36	111	0.000e+00	1.519e+06	36	112	0.000e+00	1.985e+06	36	113	0.000e+00	1.276e+06
36	114	0.000e+00	1.129e+06	36	116	0.000e+00	6.199e+05	36	118	0.000e+00	1.100e+07
36	119	0.000e+00	1.960e+07	36	120	0.000e+00	8.716e+06	36	121	0.000e+00	1.920e+07
37	39	8.906e−02	2.321e+08	37	41	2.527e−01	7.983e+08	37	45	0.000e+00	9.337e+04
37	47	7.300e−02	1.499e+09	37	49	5.218e−01	1.379e+10	37	75	8.340e−04	7.832e+07
37	89	0.000e+00	4.347e+04	37	91	0.000e+00	1.412e+06	37	100	2.273e−04	4.171e+07
37	105	1.807e−02	3.466e+09	37	107	7.451e−03	1.571e+09	37	109	1.904e−01	4.129e+10
37	118	0.000e+00	8.673e+06	37	120	0.000e+00	1.082e+07	37	123	0.000e+00	8.530e+04
37	128	0.000e+00	6.127e+05	37	132	0.000e+00	9.705e+05	37	158	3.954e−03	1.270e+09
38	42	3.455e−01	2.264e+09	38	54	1.436e−01	3.025e+09	38	55	6.027e−02	1.435e+09
38	58	1.966e−01	5.260e+09	38	61	9.004e−02	2.590e+09	38	88	1.102e−03	1.054e+08
38	92	0.000e+00	1.141e+05	38	94	0.000e+00	7.463e+05	38	99	1.011e−01	1.437e+10
38	101	0.000e+00	1.382e+05	38	108	0.000e+00	3.356e+06	38	111	1.633e−02	3.172e+09
38	116	6.608e−03	1.307e+09	38	119	2.141e−01	4.295e+10	38	130	0.000e+00	2.141e+07
38	143	0.000e+00	1.120e+05	39	42	1.810e−01	1.177e+09	39	43	7.176e−01	2.838e+09
39	45	1.659e−01	6.859e+08	39	54	3.603e−01	7.559e+09	39	56	2.543e−01	3.657e+09
39	57	1.146e−01	8.467e+09	39	58	5.139e−02	1.370e+09	39	60	4.574e−01	7.733e+09
39	61	8.013e−02	2.297e+09	39	62	8.561e−02	1.634e+09	39	63	5.035e−03	5.730e+08
39	88	4.304e−04	4.108e+07	39	89	1.068e−03	6.141e+07	39	92	0.000e+00	5.765e+05
39	93	0.000e+00	7.635e+05	39	95	0.000e+00	7.523e+05	39	96	0.000e+00	1.539e+05
39	99	2.209e−01	3.135e+10	39	100	0.000e+00	2.442e+05	39	101	0.000e+00	2.446e+05
39	103	7.150e−02	3.131e+10	39	105	0.000e+00	7.396e+05	39	107	0.000e+00	1.930e+06
39	108	0.000e+00	5.469e+06	39	109	0.000e+00	4.883e+06	39	111	8.852e−03	1.717e+09
39	112	3.570e−02	4.171e+09	39	116	2.845e−03	5.619e+08	39	118	5.191e−01	6.238e+10
39	119	1.178e−01	2.359e+10	39	120	7.025e−03	8.460e+08	39	122	3.582e−04	7.301e+07
39	123	5.426e−04	6.697e+07	39	128	6.173e−03	7.997e+08	39	130	0.000e+00	1.551e+07
39	131	0.000e+00	2.320e+07	39	132	8.736e−03	1.140e+09	39	134	0.000e+00	1.096e+07
39	144	0.000e+00	9.414e+04	39	147	3.691e−04	2.660e+08	39	157	0.000e+00	6.478e+05
40	42	1.599e−02	9.170e+07	40	43	2.406e−01	8.400e+08	40	44	1.452e+00	3.707e+09
40	55	1.553e−01	3.453e+09	40	56	3.686e−01	4.970e+09	40	58	1.571e−01	3.940e+09
40	59	1.222e+00	1.351e+10	40	60	2.618e−01	4.172e+09	40	61	6.139e−02	1.659e+09
40	62	1.192e−01	2.153e+09	40	89	6.914e−04	3.849e+07	40	90	2.925e−03	1.173e+08
40	93	0.000e+00	1.154e+05	40	94	0.000e+00	7.094e+04	40	96	0.000e+00	3.852e+05
40	97	0.000e+00	9.334e+05	40	98	0.000e+00	9.758e+05	40	99	5.388e−01	7.447e+10
40	100	0.000e+00	9.744e+05	40	101	0.000e+00	5.642e+05	40	102	0.000e+00	1.176e+06
40	106	0.000e+00	1.672e+07	40	107	0.000e+00	1.211e+07	40	108	0.000e+00	5.810e+06
40	109	0.000e+00	3.974e+05	40	110	1.729e−03	1.394e+08	40	111	8.581e−04	1.628e+08
40	112	1.620e−02	1.851e+09	40	113	6.101e−02	5.000e+09	40	114	5.426e−02	4.452e+09
40	118	9.708e−02	1.141e+10	40	119	1.173e−02	2.298e+09	40	120	7.595e−02	8.948e+09
40	121	9.319e−01	7.844e+10	40	122	6.831e−04	1.362e+08	40	130	0.000e+00	3.002e+06
40	131	0.000e+00	1.500e+07	40	133	0.000e+00	4.508e+07	40	145	0.000e+00	2.029e+05
41	42	7.094e−02	4.043e+08	41	43	8.493e−02	2.946e+08	41	45	8.813e−01	3.206e+09
41	54	5.698e−02	1.112e+09	41	55	2.870e−01	6.359e+09	41	56	2.103e−01	2.826e+09
41	57	1.993e−02	1.377e+09	41	58	5.976e−02	1.494e+09	41	60	1.149e−02	1.826e+08
41	61	1.635e−01	4.406e+09	41	62	3.867e−01	6.962e+09	41	63	8.569e−02	9.243e+09
41	88	4.506e−04	4.158e+07	41	89	1.521e−03	8.452e+07	41	92	0.000e+00	2.048e+05
41	93	0.000e+00	7.641e+04	41	94	0.000e+00	9.673e+04	41	95	0.000e+00	1.903e+05
41	96	0.000e+00	3.851e+05	41	99	8.894e−02	1.228e+10	41	101	0.000e+00	2.507e+05
41	103	1.975e−01	8.417e+10	41	104	0.000e+00	2.929e+05	41	105	0.000e+00	3.371e+06
41	107	0.000e+00	2.474e+06	41	108	0.000e+00	2.055e+06	41	109	0.000e+00	7.964e+06
41	111	3.078e−03	5.832e+08	41	112	1.343e−02	1.533e+09	41	116	3.279e−03	6.327e+08
41	118	3.295e−02	3.869e+09	41	119	4.644e−02	9.091e+09	41	120	5.878e−01	6.918e+10
41	123	2.673e−03	3.224e+08	41	128	1.650e−02	2.091e+09	41	130	0.000e+00	5.762e+06
41	131	0.000e+00	7.256e+06	41	132	2.675e−02	3.414e+09	41	134	0.000e+00	3.156e+07
41	147	8.548e−04	6.031e+08	41	157	0.000e+00	1.688e+06	42	50	3.828e−01	4.344e+08
42	64	6.888e−02	9.362e+08	42	65	2.442e−01	5.543e+09	42	66	1.340e−02	1.836e+08
42	68	2.638e−01	4.177e+09	42	72	2.894e−02	4.979e+08	42	73	2.279e−01	6.576e+09
42	74	1.350e−01	1.203e+10	42	75	1.037e−02	3.167e+08	42	92	3.907e−03	1.886e+08

(continued on next page)

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
42	93	1.103e-03	9.058e+07	42	94	2.784e-03	1.379e+08	42	96	2.469e-03	1.239e+08
42	99	0.000e+00	1.942e+06	42	106	1.301e-01	4.170e+10	42	107	9.234e-02	9.901e+09
42	108	6.064e-03	3.946e+08	42	109	2.819e-03	3.146e+08	42	111	0.000e+00	8.797e+05
42	112	0.000e+00	1.027e+06	42	113	0.000e+00	1.911e+05	42	116	0.000e+00	1.966e+05
42	118	0.000e+00	1.007e+06	42	119	0.000e+00	1.810e+06	42	120	0.000e+00	8.561e+05
42	121	0.000e+00	1.467e+05	42	122	0.000e+00	1.174e+05	42	123	0.000e+00	4.194e+05
42	124	0.000e+00	1.516e+05	42	128	0.000e+00	8.375e+04	42	129	0.000e+00	4.706e+05
42	130	1.953e+00	1.743e+11	42	135	0.000e+00	3.077e+07	42	143	1.384e-02	1.339e+09
43	51	5.493e-01	4.372e+08	43	64	1.448e-01	1.954e+09	43	65	2.188e-01	4.929e+09
43	66	2.445e-01	3.326e+09	43	68	1.104e-01	1.736e+09	43	69	3.820e-01	4.341e+09
43	71	1.562e-01	1.874e+09	43	72	2.234e-01	3.819e+09	43	73	1.288e-01	3.693e+09
43	75	6.253e-02	1.898e+09	43	95	5.515e-03	1.960e+08	43	96	1.871e-03	9.358e+07
43	97	2.595e-03	9.395e+07	43	99	0.000e+00	3.137e+06	43	103	0.000e+00	3.379e+05
43	105	2.321e-03	2.169e+08	43	107	2.949e-01	3.152e+10	43	108	8.946e-02	5.803e+09
43	110	0.000e+00	1.309e+05	43	111	0.000e+00	1.622e+06	43	112	0.000e+00	7.391e+05
43	113	0.000e+00	3.135e+05	43	114	0.000e+00	5.029e+05	43	115	0.000e+00	9.434e+04
43	116	0.000e+00	7.763e+04	43	118	0.000e+00	1.447e+06	43	119	0.000e+00	3.038e+06
43	120	0.000e+00	1.133e+05	43	121	0.000e+00	1.405e+06	43	122	0.000e+00	1.832e+05
43	123	0.000e+00	2.690e+05	43	124	0.000e+00	3.901e+05	43	125	0.000e+00	1.149e+05
43	126	0.000e+00	9.468e+05	43	127	0.000e+00	2.165e+05	43	128	0.000e+00	2.049e+05
43	129	0.000e+00	8.626e+04	43	130	3.531e-01	3.142e+10	43	131	2.863e+00	1.820e+11
43	132	0.000e+00	1.288e+05	43	134	7.045e-02	4.533e+09	43	135	0.000e+00	8.285e+06
43	136	0.000e+00	3.218e+07	43	139	0.000e+00	1.274e+06	43	143	2.660e-03	2.566e+08
43	144	1.812e-02	1.252e+09	43	157	3.935e-03	3.018e+08	44	52	8.076e-01	4.843e+08
44	64	3.054e-03	4.072e+07	44	66	3.183e-01	4.279e+09	44	67	6.418e-01	6.239e+09
44	68	1.475e-02	2.294e+08	44	69	3.484e-01	3.916e+09	44	70	6.435e-01	5.905e+09
44	71	6.340e-02	7.524e+08	44	72	3.303e-01	5.586e+09	44	97	1.802e-03	6.485e+07
44	98	6.840e-03	1.940e+08	44	99	0.000e+00	4.533e+06	44	108	5.300e-01	3.419e+10
44	110	0.000e+00	6.525e+04	44	111	0.000e+00	1.676e+05	44	112	0.000e+00	1.245e+06
44	113	0.000e+00	1.308e+06	44	114	0.000e+00	9.509e+05	44	117	0.000e+00	1.002e+05
44	118	0.000e+00	1.160e+06	44	119	0.000e+00	3.308e+05	44	120	0.000e+00	9.233e+05
44	121	0.000e+00	3.381e+06	44	122	0.000e+00	3.345e+05	44	124	0.000e+00	2.227e+05
44	125	0.000e+00	6.574e+05	44	128	0.000e+00	3.532e+05	44	129	0.000e+00	4.219e+05
44	130	1.054e-02	9.332e+08	44	131	3.692e-01	2.337e+10	44	132	0.000e+00	1.870e+05
44	133	4.285e+00	2.110e+11	44	135	0.000e+00	5.698e+05	44	136	0.000e+00	6.667e+06
44	137	0.000e+00	4.015e+07	44	144	2.680e-03	1.844e+08	44	145	2.582e-02	1.386e+09
45	53	7.117e-01	7.757e+08	45	64	3.032e-01	3.992e+09	45	65	9.634e-03	2.118e+08
45	66	1.475e-01	1.957e+09	45	67	9.895e-02	9.499e+08	45	68	2.252e-01	3.462e+09
45	69	1.012e-01	1.125e+09	45	71	3.526e-01	4.138e+09	45	72	1.228e-01	2.053e+09
45	73	5.937e-02	1.665e+09	45	75	3.540e-01	1.052e+10	45	93	6.630e-04	5.356e+07
45	96	8.004e-04	3.952e+07	45	97	1.879e-03	6.716e+07	45	99	0.000e+00	1.029e+05
45	100	6.318e-04	5.471e+07	45	103	0.000e+00	9.763e+06	45	104	6.356e-02	2.479e+09
45	105	4.524e-02	4.177e+09	45	108	2.965e-03	1.902e+08	45	109	3.228e-01	3.551e+10
45	110	0.000e+00	8.499e+05	45	114	0.000e+00	1.680e+05	45	116	0.000e+00	1.265e+06
45	118	0.000e+00	2.898e+06	45	120	0.000e+00	4.885e+06	45	127	0.000e+00	4.415e+06
45	130	1.199e-02	1.057e+09	45	131	6.363e-02	4.007e+09	45	134	2.990e+00	1.906e+11
45	135	0.000e+00	2.728e+05	45	136	0.000e+00	1.194e+06	45	139	0.000e+00	3.400e+07
45	144	1.352e-03	9.257e+07	45	147	0.000e+00	2.201e+05	45	157	1.134e-01	8.619e+09
46	54	1.016e-01	3.060e+08	46	55	3.748e-01	1.537e+09	46	58	6.248e-02	3.357e+08
46	64	0.000e+00	2.652e+04	46	66	0.000e+00	9.396e+04	46	85	1.432e-02	5.943e+08
46	88	2.946e-01	1.412e+10	46	119	1.391e-03	1.779e+08	46	130	0.000e+00	7.896e+04
47	54	2.594e-01	7.174e+08	47	55	2.063e-02	7.866e+07	47	56	8.235e-01	1.935e+09
47	57	1.778e-01	2.230e+09	47	58	1.820e-01	9.183e+08	47	60	9.460e-02	3.245e+08
47	61	5.935e-02	3.523e+08	47	63	7.503e-03	2.366e+08	47	64	0.000e+00	6.861e+04
47	65	0.000e+00	1.138e+05	47	67	0.000e+00	1.148e+05	47	84	1.750e-02	4.178e+08
47	85	9.341e-03	3.790e+08	47	87	5.806e-03	1.561e+08	47	88	1.912e-01	8.977e+09
47	89	6.671e-01	1.889e+10	47	91	5.629e-02	1.688e+09	47	99	9.164e-04	7.413e+07
47	103	2.696e-03	6.795e+08	47	105	0.000e+00	4.452e+04	47	119	1.013e-03	1.280e+08
47	120	1.010e-02	7.672e+08	47	131	0.000e+00	9.385e+04	47	134	0.000e+00	2.731e+05
48	56	5.419e-02	8.407e+07	48	58	9.011e-02	3.169e+08	48	59	1.233e+00	2.000e+09
48	60	7.442e-01	1.823e+09	48	61	4.768e-01	2.035e+09	48	62	8.755e-02	2.908e+08
48	68	0.000e+00	3.844e+04	48	69	0.000e+00	1.154e+05	48	70	0.000e+00	1.354e+05
48	72	0.000e+00	8.742e+04	48	73	0.000e+00	1.158e+05	48	74	0.000e+00	1.612e+05
48	83	2.312e-02	3.428e+08	48	88	1.393e-02	5.851e+08	48	89	2.060e-01	5.220e+09
48	90	1.232e+00	2.259e+10	48	91	6.144e-03	1.654e+08	48	99	1.125e-03	8.365e+07
48	121	5.053e-03	2.564e+08	48	133	0.000e+00	1.277e+05	49	54	3.888e-02	4.313e+07
49	55	8.222e-02	1.483e+08	49	58	1.684e-01	4.507e+08	49	60	5.782e-02	1.101e+08
49	61	6.162e-02	2.056e+08	49	62	8.976e-01	2.406e+09	49	63	2.692e-01	5.595e+09
49	68	0.000e+00	5.268e+04	49	71	0.000e+00	9.072e+04	49	75	0.000e+00	1.029e+05
49	88	2.577e-02	1.004e+09	49	89	1.101e-02	2.590e+08	49	91	1.011e+00	2.532e+10
49	103	1.098e-02	2.411e+09	49	104	0.000e+00	5.853e+04	49	105	0.000e+00	2.156e+05
49	109	0.000e+00	1.335e+05	49	118	1.587e-02	1.075e+09	49	120	1.557e-02	1.058e+09
49	134	0.000e+00	1.023e+06	50	76	2.030e-01	1.816e+09	50	79	3.794e-01	5.180e+09
50	80	2.753e-01	2.957e+09	50	83	3.371e-02	3.974e+08	50	84	3.210e-01	5.411e+09

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
50	85	5.053e−01	1.453e+10	50	88	1.394e−02	4.761e+08	50	89	3.045e−03	6.277e+07
50	106	0.000e+00	1.557e+06	50	107	0.000e+00	5.035e+05	50	108	0.000e+00	4.472e+04
50	110	4.311e−03	1.827e+08	50	111	3.739e−03	3.741e+08	50	112	1.080e−03	6.521e+07
50	113	6.513e−02	2.823e+09	50	114	7.571e−02	3.288e+09	50	116	1.941e−03	1.991e+08
50	118	6.773e−03	4.251e+08	50	119	6.636e−02	6.942e+09	50	120	5.235e−03	3.295e+08
50	130	0.000e+00	2.700e+06	50	131	0.000e+00	8.397e+05	50	135	6.732e+00	3.515e+11
50	138	0.000e+00	2.483e+05	50	140	0.000e+00	3.020e+05	50	143	0.000e+00	3.256e+05
50	144	0.000e+00	8.813e+04	50	148	0.000e+00	8.033e+05	50	151	0.000e+00	4.955e+05
50	152	0.000e+00	2.504e+05	50	155	0.000e+00	5.888e+05	50	156	0.000e+00	9.788e+05
51	76	1.188e−01	1.061e+09	51	77	2.431e−01	2.302e+09	51	78	1.841e−01	1.357e+09
51	79	2.616e−01	3.565e+09	51	80	1.676e−01	1.797e+09	51	82	4.758e−01	4.050e+09
51	83	4.046e−01	4.761e+09	51	84	4.874e−01	8.200e+09	51	86	1.371e−02	1.419e+08
51	87	5.508e−02	1.067e+09	51	89	1.258e−02	2.590e+08	51	90	2.320e−03	3.460e+07
51	107	0.000e+00	1.011e+06	51	108	0.000e+00	3.125e+05	51	112	7.573e−03	4.566e+08
51	113	1.085e−02	4.701e+08	51	114	3.016e−03	1.309e+08	51	115	1.970e−01	6.684e+09
51	118	5.745e−02	3.602e+09	51	120	4.173e−02	2.624e+09	51	121	1.167e−02	5.243e+08
51	127	3.003e−03	1.158e+08	51	130	0.000e+00	1.183e+06	51	131	0.000e+00	2.212e+06
51	133	0.000e+00	6.801e+05	51	135	5.862e−01	3.058e+10	51	136	8.844e+00	3.589e+11
51	139	3.831e−03	1.594e+08	51	141	0.000e+00	5.740e+05	51	143	0.000e+00	1.775e+05
51	144	0.000e+00	3.009e+05	51	149	0.000e+00	7.511e+05	51	151	0.000e+00	6.127e+05
51	152	0.000e+00	2.795e+05	51	153	0.000e+00	2.497e+05	51	154	0.000e+00	4.529e+05
51	155	0.000e+00	3.957e+05	52	77	3.753e−01	3.542e+09	52	78	5.607e−01	4.120e+09
52	80	9.987e−02	1.068e+09	52	81	7.988e−01	5.523e+09	52	82	5.743e−01	4.875e+09
52	83	6.404e−01	7.516e+09	52	86	4.934e−02	5.094e+08	52	90	6.962e−03	1.036e+08
52	108	0.000e+00	1.203e+06	52	113	5.831e−03	2.522e+08	52	114	8.422e−03	3.649e+08
52	115	1.315e−02	4.455e+08	52	117	2.719e−01	7.611e+09	52	121	1.394e−01	6.257e+09
52	131	0.000e+00	8.782e+05	52	133	0.000e+00	3.213e+06	52	135	9.249e−03	4.818e+08
52	136	5.862e−01	2.376e+10	52	137	1.155e+01	3.833e+11	52	141	0.000e+00	7.647e+04
52	142	0.000e+00	6.598e+05	52	144	0.000e+00	1.486e+05	52	145	0.000e+00	4.629e+05
52	150	0.000e+00	9.360e+05	52	152	0.000e+00	5.687e+05	52	153	0.000e+00	8.184e+05
52	154	0.000e+00	3.953e+05	53	76	2.829e−01	2.215e+09	53	77	2.778e−01	2.315e+09
53	78	2.553e−02	1.657e+08	53	79	3.773e−02	4.536e+08	53	80	2.968e−01	2.824e+09
53	83	5.733e−02	6.021e+08	53	84	1.942e−02	2.919e+08	53	86	4.963e−01	4.617e+09
53	87	8.279e−01	1.444e+10	53	89	6.295e−03	1.171e+08	53	105	0.000e+00	1.356e+05
53	107	0.000e+00	3.924e+04	53	109	0.000e+00	1.498e+06	53	110	1.505e−02	6.005e+08
53	118	5.523e−02	3.269e+09	53	120	7.168e−02	4.256e+09	53	125	3.277e−03	1.133e+08
53	127	2.310e+00	8.433e+10	53	128	5.457e−03	3.592e+08	53	132	8.215e−03	5.464e+08
53	134	0.000e+00	4.266e+06	53	136	5.093e−03	1.960e+08	53	138	0.000e+00	2.644e+05
53	139	7.633e+00	3.014e+11	53	140	0.000e+00	2.250e+05	53	146	0.000e+00	8.690e+05
53	157	0.000e+00	3.323e+05	53	158	0.000e+00	9.672e+05	53	159	0.000e+00	1.316e+06
54	64	1.238e+00	5.532e+09	54	65	1.693e−01	1.266e+09	54	68	1.126e−02	6.522e+07
54	73	9.510e−02	1.062e+09	54	74	6.260e−03	2.196e+08	54	75	4.139e−02	5.059e+08
54	92	5.733e−01	1.656e+10	54	93	6.234e−02	3.083e+09	54	94	4.343e−02	1.297e+09
54	96	1.344e−02	4.084e+08	54	100	1.648e−02	8.905e+08	54	101	1.367e−03	4.447e+07
54	102	4.939e−04	8.033e+07	54	105	3.172e−02	1.858e+09	54	106	3.349e−03	6.929e+08
54	107	5.526e−03	3.830e+08	54	109	2.651e−03	1.931e+08	54	130	7.057e−02	4.375e+09
54	135	0.000e+00	5.358e+05	55	66	8.968e−01	3.254e+09	55	68	3.681e−01	1.753e+09
55	72	2.124e−02	1.174e+08	55	73	4.430e−02	4.126e+08	55	74	1.398e−02	4.109e+08
55	75	7.954e−02	8.177e+08	55	92	1.766e−02	4.686e+08	55	93	9.203e−02	4.184e+09
55	94	8.070e−02	2.216e+09	55	96	3.758e−01	1.051e+10	55	100	1.178e−01	5.871e+09
55	101	2.837e−03	8.515e+07	55	102	6.311e−02	9.473e+09	55	105	3.393e−02	1.840e+09
55	106	3.551e−03	6.844e+08	55	108	5.001e−04	1.966e+07	55	109	3.738e−03	2.540e+08
55	130	3.948e−02	2.310e+09	55	135	0.000e+00	2.686e+05	56	64	1.516e−01	5.298e+08
56	65	1.553e−02	9.085e+07	56	66	5.082e−02	1.805e+08	56	67	1.389e+00	3.610e+09
56	68	1.565e−01	7.316e+08	56	69	3.759e−01	1.282e+09	56	71	2.589e−01	9.734e+08
56	72	2.973e−02	1.615e+08	56	73	2.338e−02	2.141e+08	56	75	1.777e−02	1.798e+08
56	93	2.610e−02	1.177e+09	56	94	8.737e−03	2.381e+08	56	95	3.739e−01	7.363e+09
56	96	3.105e−01	8.618e+09	56	97	4.521e−01	9.126e+09	56	100	3.010e−02	1.489e+09
56	101	1.927e−02	5.741e+08	56	104	6.796e−02	1.539e+09	56	107	1.108e−02	7.105e+08
56	108	2.958e−03	1.155e+08	56	109	8.797e−04	5.941e+07	56	119	0.000e+00	4.922e+04
56	130	1.719e−02	1.001e+09	56	131	1.356e−01	5.641e+09	56	134	1.419e−02	5.991e+08
56	135	0.000e+00	1.740e+05	56	136	0.000e+00	6.819e+05	57	65	3.513e−01	1.944e+09
57	73	2.135e−02	1.870e+08	57	75	1.561e−02	1.514e+08	57	93	3.063e−01	1.355e+10
57	100	4.484e−02	2.178e+09	57	105	1.733e−03	9.164e+07	57	107	2.550e−04	1.609e+07
58	65	1.201e−01	5.555e+08	58	66	1.768e−01	4.975e+08	58	68	5.597e−01	2.139e+09
58	72	1.498e−01	6.757e+08	58	73	1.236e−01	9.404e+08	58	74	6.234e−02	1.505e+09
58	75	6.522e−02	5.534e+08	58	92	7.445e−03	1.805e+08	58	93	6.475e−02	2.693e+09
58	94	5.999e−01	1.508e+10	58	96	4.089e−02	1.047e+09	58	100	1.056e−01	4.837e+09
58	101	2.290e−03	6.315e+07	58	102	7.638e−02	1.053e+10	58	105	2.694e−02	1.347e+09
58	107	6.080e−04	3.644e+07	58	109	2.078e−03	1.314e+08	58	130	7.924e−03	4.365e+08
58	135	0.000e+00	4.773e+04	59	68	2.575e−02	9.302e+07	59	69	5.064e−01	1.339e+09
59	70	2.752e+00	6.246e+09	59	71	2.964e−02	8.749e+07	59	72	1.313e−01	5.621e+08
59	94	5.392e−03	1.326e+08	59	95	3.943e−03	7.011e+07	59	96	2.127e−02	5.332e+08
59	97	3.451e−01	6.299e+09	59	98	1.290e+00	1.866e+10	59	101	1.351e−02	3.649e+08

(continued on next page)

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
59	108	1.743e-02	6.251e+08	59	131	1.517e-02	5.886e+08	59	133	1.772e-01	5.350e+09
59	136	0.000e+00	1.042e+05	59	137	0.000e+00	6.264e+05	60	64	1.877e-02	4.510e+07
60	67	3.135e-01	5.646e+08	60	68	2.053e-01	6.968e+08	60	69	6.129e-01	1.524e+09
60	71	2.387e-01	6.651e+08	60	72	3.534e-01	1.430e+09	60	73	1.901e-01	1.298e+09
60	75	1.070e-02	8.195e+07	60	92	9.807e-02	2.270e+09	60	94	6.456e-03	1.551e+08
60	95	7.989e-01	1.388e+10	60	96	3.198e-02	7.831e+08	60	97	3.420e-01	6.098e+09
60	100	6.935e-02	3.041e+09	60	101	2.369e-01	6.255e+09	60	104	6.534e-02	1.317e+09
60	107	3.345e-04	1.931e+07	60	108	1.562e-03	5.495e+07	60	131	1.171e-02	4.472e+08
60	134	2.389e-02	9.264e+08	60	136	0.000e+00	4.210e+04	60	139	0.000e+00	7.464e+04
61	72	6.307e-01	2.463e+09	61	73	3.398e-01	2.241e+09	61	74	2.359e-01	4.956e+09
61	75	2.766e-01	2.051e+09	61	92	6.565e-03	1.497e+08	61	93	4.155e-02	1.628e+09
61	94	6.048e-02	1.432e+09	61	96	8.355e-02	2.017e+09	61	100	8.925e-02	3.861e+09
61	101	4.099e-01	1.068e+10	61	102	2.259e-02	2.943e+09	61	105	2.881e-02	1.364e+09
61	106	1.391e-04	2.367e+07	61	107	5.036e-04	2.872e+07	61	108	2.189e-03	7.609e+07
61	109	1.377e-03	8.293e+07	62	64	2.628e-02	4.391e+07	62	68	3.041e-02	7.638e+07
62	69	2.804e-01	5.181e+08	62	71	1.215e+00	2.560e+09	62	72	1.446e-01	4.448e+08
62	75	8.917e-02	5.289e+08	62	92	1.851e-01	3.838e+09	62	93	2.890e-03	1.031e+08
62	94	9.132e-02	1.969e+09	62	95	3.351e-03	5.228e+07	62	96	1.871e-03	4.118e+07
62	97	8.828e-02	1.432e+09	62	100	1.373e-02	5.432e+08	62	101	1.088e-01	2.593e+09
62	104	1.082e+00	1.974e+10	62	105	9.192e-03	3.996e+08	62	107	3.496e-04	1.845e+07
62	116	0.000e+00	7.955e+04	62	127	0.000e+00	2.093e+05	62	134	1.378e-01	4.976e+09
62	139	0.000e+00	3.285e+05	62	157	1.466e-02	6.671e+08	63	73	5.824e-02	1.809e+08
63	75	2.576e-01	9.469e+08	63	100	4.054e-03	1.350e+08	63	105	3.838e-01	1.416e+10
63	107	5.959e-04	2.712e+07	63	109	9.836e-03	4.757e+08	63	158	8.585e-03	8.846e+08
64	76	5.731e-01	3.447e+08	64	110	5.546e-01	1.023e+10	64	111	4.680e-02	2.050e+09
64	113	1.337e-01	2.552e+09	64	114	1.569e-01	3.002e+09	64	116	5.298e-02	2.410e+09
64	118	1.288e-02	3.620e+08	64	119	2.594e-03	1.215e+08	64	120	1.323e-02	3.734e+08
64	122	4.996e-03	2.425e+08	64	123	1.760e-01	5.221e+09	64	128	1.264e-01	4.136e+09
64	132	7.579e-02	2.517e+09	64	135	7.081e-02	1.777e+09	65	79	4.226e-01	4.839e+08
65	88	5.154e-03	3.106e+07	65	103	9.599e-04	6.547e+07	65	111	3.574e-01	1.563e+10
65	112	1.907e-02	5.046e+08	65	116	9.881e-03	4.489e+08	65	118	1.428e-02	4.006e+08
65	119	1.630e-02	7.626e+08	65	122	8.903e-03	4.315e+08	65	123	2.951e-01	8.744e+09
65	126	7.238e-02	1.179e+10	65	128	6.380e-03	2.085e+08	65	129	7.360e-03	4.010e+08
65	147	9.947e-03	1.999e+09	66	77	6.080e-01	4.409e+08	66	99	1.984e-03	4.166e+07
66	110	6.553e-02	1.201e+09	66	111	7.751e-02	3.376e+09	66	112	3.914e-01	1.031e+10
66	113	5.040e-02	9.564e+08	66	114	6.493e-02	1.236e+09	66	116	5.542e-02	2.507e+09
66	118	2.492e-02	6.962e+08	66	119	1.553e-02	7.232e+08	66	120	5.108e-03	1.433e+08
66	121	2.444e-03	4.902e+07	66	122	4.903e-02	2.366e+09	66	123	1.059e-01	3.126e+09
66	124	2.604e-01	5.534e+09	66	128	5.169e-02	1.682e+09	66	129	1.405e-01	7.625e+09
66	132	1.598e-02	5.279e+08	66	135	1.228e-02	3.067e+08	67	78	7.854e-01	4.248e+08
67	110	1.844e-01	3.350e+09	67	112	1.187e-01	3.101e+09	67	113	2.552e-01	4.799e+09
67	114	1.747e-02	3.295e+08	67	115	4.312e-01	6.379e+09	67	118	1.240e-02	3.436e+08
67	120	7.035e-03	1.957e+08	67	121	2.910e-02	5.787e+08	67	123	1.370e-02	4.010e+08
67	124	2.391e-01	5.039e+09	67	125	2.269e-01	3.756e+09	67	127	4.483e-02	8.020e+08
67	128	7.871e-02	2.542e+09	67	132	4.184e-03	1.371e+08	67	135	4.259e-03	1.055e+08
67	136	6.542e-02	1.262e+09	67	139	1.400e-01	2.800e+09	68	80	5.096e-01	3.383e+08
68	110	1.701e-01	2.786e+09	68	111	7.218e-03	2.812e+08	68	112	1.114e-01	2.626e+09
68	113	2.608e-01	4.430e+09	68	114	1.991e-01	3.393e+09	68	116	3.974e-02	1.611e+09
68	119	1.803e-03	7.541e+07	68	120	2.509e-02	6.324e+08	68	123	4.356e-02	1.158e+09
68	124	2.319e-01	4.441e+09	68	128	1.031e-01	3.037e+09	68	129	1.514e-02	7.436e+08
68	132	6.631e-02	1.984e+09	68	135	5.632e-02	1.277e+09	69	82	6.580e-01	3.516e+08
69	112	6.443e-03	1.504e+08	69	113	1.259e-01	2.119e+09	69	114	3.614e-01	6.099e+09
69	115	4.365e-01	5.781e+09	69	121	5.832e-02	1.041e+09	69	123	7.131e-03	1.878e+08
69	124	4.655e-02	8.833e+08	69	125	5.119e-01	7.634e+09	69	127	3.218e-02	5.207e+08
69	128	3.359e-02	9.811e+08	69	132	4.801e-02	1.424e+09	69	135	4.555e-03	1.025e+08
69	136	7.092e-02	1.242e+09	69	139	5.034e-02	9.156e+08	70	81	9.786e-01	3.405e+08
70	113	4.475e-02	7.231e+08	70	114	1.878e-02	3.043e+08	70	115	8.181e-02	1.041e+09
70	117	1.435e+00	1.517e+10	70	121	2.619e-02	4.493e+08	70	124	2.886e-02	5.271e+08
70	125	4.824e-01	6.927e+09	70	136	1.060e-02	1.792e+08	70	137	2.230e-01	3.088e+09
71	86	1.014e+00	9.140e+08	71	110	4.023e-01	6.230e+09	71	112	1.994e-02	4.447e+08
71	113	2.862e-02	4.602e+08	71	114	1.522e-02	2.454e+08	71	115	2.568e-01	3.251e+09
71	120	4.542e-03	1.085e+08	71	123	1.077e-02	2.717e+08	71	124	1.176e-01	2.138e+09
71	127	2.118e-01	3.290e+09	71	128	4.501e-03	1.262e+08	71	132	3.187e-02	9.080e+08
71	135	2.422e-03	5.239e+07	71	136	4.166e-02	7.013e+08	71	139	4.808e-01	8.414e+09
72	83	5.085e-01	3.490e+08	72	89	1.578e-02	3.356e+07	72	90	2.549e-02	4.047e+07
72	99	1.037e-02	1.664e+08	72	110	8.883e-03	1.354e+08	72	112	7.534e-03	1.655e+08
72	113	2.644e-01	4.187e+09	72	114	3.057e-01	4.856e+09	72	118	2.928e-03	6.860e+07
72	121	1.191e-02	2.004e+08	72	122	2.980e-01	1.210e+10	72	123	5.569e-03	1.385e+08
72	124	4.477e-02	8.023e+08	72	128	1.693e-01	4.683e+09	72	129	5.889e-02	2.716e+09
72	132	2.854e-01	8.022e+09	73	84	2.494e-01	2.544e+08	73	85	1.063e-01	1.983e+08
73	88	1.401e-02	4.781e+07	73	99	4.767e-03	7.588e+07	73	103	2.057e-03	1.068e+08
73	111	2.607e-02	9.407e+08	73	112	2.526e-01	5.517e+09	73	116	1.330e-01	5.002e+09
73	119	5.555e-03	2.158e+08	73	120	1.712e-02	4.006e+08	73	122	9.169e-02	3.702e+09
73	123	4.140e-02	1.024e+09	73	126	4.493e-02	6.164e+09	73	128	1.423e-01	3.916e+09

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
73	129	9.489e-02	4.355e+09	73	147	2.534e-02	4.365e+09	74	85	1.319e-01	2.186e+08
74	88	1.345e-02	4.212e+07	74	99	2.443e-03	3.738e+07	74	111	1.006e-01	3.535e+09
74	116	1.397e-02	5.122e+08	74	122	5.762e-02	2.270e+09	74	129	1.231e-01	5.518e+09
75	87	4.074e-01	5.765e+08	75	103	5.924e-03	2.852e+08	75	111	2.192e-03	7.506e+07
75	112	5.867e-02	1.217e+09	75	116	3.960e-01	1.415e+10	75	118	2.128e-02	4.715e+08
75	119	7.175e-03	2.650e+08	75	120	2.152e-02	4.791e+08	75	122	1.013e-01	3.894e+09
75	123	3.289e-03	7.746e+07	75	126	3.762e-02	4.927e+09	75	129	1.965e-02	8.610e+08
75	132	1.269e-01	3.389e+09	75	147	9.163e-02	1.514e+10	76	130	5.666e-03	1.328e+08
76	134	1.275e-02	2.186e+08	76	138	9.084e-01	1.319e+10	76	140	7.533e-02	1.106e+09
76	143	1.355e-01	3.709e+09	76	146	8.617e-02	2.493e+09	76	148	4.088e-01	8.962e+09
76	153	2.457e-02	5.561e+08	76	154	7.838e-03	2.523e+08	76	157	1.904e-01	4.530e+09
77	108	1.432e-03	1.615e+07	77	131	6.198e-03	9.941e+07	77	133	9.804e-03	1.224e+08
77	134	1.158e-02	1.901e+08	77	138	2.700e-02	3.761e+08	77	140	3.469e-01	4.888e+09
77	143	5.543e-02	1.457e+09	77	144	3.481e-01	6.571e+09	77	146	1.515e-01	4.214e+09
77	148	8.018e-02	1.692e+09	77	149	2.689e-01	4.450e+09	77	152	3.752e-01	1.142e+10
77	153	8.987e-02	1.958e+09	77	154	3.490e-02	1.082e+09	77	157	2.214e-01	5.077e+09
78	131	6.233e-03	9.990e+07	78	138	2.362e-03	3.288e+07	78	140	1.074e-01	1.512e+09
78	141	8.818e-01	1.021e+10	78	144	2.226e-01	4.199e+09	78	145	2.130e-01	3.143e+09
78	148	1.249e-02	2.634e+08	78	149	5.007e-01	8.280e+09	78	150	1.959e-01	2.667e+09
78	153	1.560e-01	3.398e+09	78	159	9.296e-02	1.501e+09	79	93	7.518e-03	6.395e+07
79	130	5.487e-03	1.205e+08	79	134	6.819e-03	1.096e+08	79	143	4.956e-01	1.277e+10
79	146	5.735e-03	1.564e+08	79	148	5.613e-01	1.162e+10	79	151	3.408e-01	1.695e+10
79	154	1.121e-02	3.413e+08	79	155	7.347e-03	3.746e+08	79	158	2.491e-02	1.444e+09
80	130	5.082e-03	1.031e+08	80	134	9.981e-03	1.483e+08	80	140	5.049e-01	6.470e+09
80	144	2.928e-01	5.037e+09	80	146	1.005e-01	2.553e+09	80	148	4.038e-02	7.804e+08
80	149	4.594e-01	6.965e+09	80	152	1.860e-01	5.193e+09	80	157	2.555e-02	5.386e+09
81	133	1.943e-02	2.163e+08	81	140	3.900e-03	4.932e+07	81	141	6.421e-02	6.680e+08
81	142	1.607e+00	1.430e+10	81	145	1.968e-01	2.614e+09	81	149	2.369e-02	3.549e+08
81	150	7.301e-01	9.009e+09	82	131	7.711e-03	1.098e+08	82	138	2.676e-02	3.332e+08
82	141	4.186e-01	4.339e+09	82	145	6.233e-01	8.250e+09	82	149	8.605e-02	1.285e+09
82	150	9.046e-01	1.112e+10	82	153	2.995e-01	5.896e+09	83	95	3.124e-02	8.398e+07
83	97	1.831e-02	5.259e+07	83	98	4.668e-02	1.093e+08	83	101	4.072e-02	1.878e+08
83	108	5.915e-03	5.110e+07	83	133	4.893e-02	5.079e+08	83	138	1.521e-02	1.779e+08
83	140	5.128e-03	6.075e+07	83	144	1.854e-02	2.953e+08	83	145	3.637e-01	4.533e+09
83	146	8.894e-03	2.097e+08	83	149	1.503e-01	2.119e+09	83	152	1.065e-01	2.769e+09
83	153	6.728e-01	1.252e+10	83	154	5.538e-01	1.469e+10	83	157	9.109e-02	1.792e+09
84	93	7.944e-03	4.526e+07	84	94	2.078e-02	7.239e+07	84	97	4.441e-02	1.221e+08
84	100	2.975e-02	2.177e+08	84	101	1.784e-02	7.901e+07	84	107	3.544e-03	4.798e+07
84	131	3.802e-02	4.968e+08	84	144	2.365e-01	3.700e+09	84	146	2.242e-02	5.193e+08
84	148	7.432e-02	1.313e+09	84	151	6.877e-02	2.926e+09	84	152	2.475e-01	6.325e+09
84	153	1.126e-01	2.062e+09	84	154	3.109e-01	8.109e+09	84	155	3.231e-01	1.412e+10
84	158	9.477e-03	4.756e+08	85	93	2.531e-02	1.369e+08	85	96	4.552e-02	1.586e+08
85	100	2.780e-02	1.663e+08	85	102	2.174e-02	4.601e+08	85	106	1.893e-03	7.350e+07
85	107	1.360e-03	1.781e+07	85	130	2.810e-02	5.023e+08	85	143	1.291e-01	2.753e+09
85	151	1.616e-01	6.746e+09	85	152	6.511e-02	1.633e+09	85	154	4.013e-02	1.027e+09
85	155	2.406e-01	1.032e+10	85	156	1.903e-01	2.456e+10	86	104	2.417e-02	7.348e+07
86	134	2.576e-02	3.122e+08	86	138	2.677e-01	2.791e+09	86	140	1.653e-01	1.746e+09
86	141	3.191e-02	2.774e+08	86	144	1.110e-02	1.581e+08	86	145	4.529e-02	5.048e+08
86	149	3.352e-02	4.258e+08	86	157	2.420e-01	4.305e+09	86	159	1.544e+00	1.961e+10
87	94	1.658e-02	4.072e+07	87	104	2.124e-02	5.936e+07	87	105	5.517e-02	3.794e+08
87	134	1.058e-01	1.230e+09	87	146	4.962e-01	1.011e+10	87	151	1.383e-02	5.206e+08
87	154	2.220e-02	5.132e+08	87	155	5.844e-03	2.264e+08	87	157	2.484e-01	4.270e+09
87	158	6.145e-01	2.757e+10	88	92	1.529e-01	2.811e+08	88	93	2.991e-01	1.016e+09
88	94	4.985e-02	1.041e+08	88	96	6.678e-01	1.489e+09	88	100	2.282e-01	1.066e+09
88	101	2.058e-02	5.833e+07	88	102	1.946e-01	2.760e+09	88	106	8.871e-04	2.584e+07
88	123	0.000e+00	7.454e+04	88	129	0.000e+00	7.665e+04	88	143	9.411e-03	1.695e+08
88	151	1.155e-02	4.131e+08	88	155	1.882e-02	6.925e+08	88	156	1.509e-02	1.672e+09
89	92	1.891e-01	3.404e+08	89	93	1.944e-01	6.477e+08	89	94	3.557e-01	7.286e+08
89	95	2.843e-01	4.339e+08	89	96	9.003e-02	1.970e+08	89	97	9.709e-01	1.617e+09
89	100	3.551e-01	1.631e+09	89	101	2.308e-01	6.431e+08	89	104	6.123e-02	1.484e+08
89	107	1.812e-03	1.761e+07	89	115	0.000e+00	7.454e+04	89	124	0.000e+00	6.701e+04
89	126	0.000e+00	1.782e+05	89	144	1.229e-02	1.581e+08	89	151	9.679e-03	3.439e+08
89	152	1.191e-02	2.543e+08	89	154	2.147e-02	4.686e+08	89	155	2.019e-02	7.386e+08
90	94	2.196e-01	4.294e+08	90	95	8.920e-01	1.301e+09	90	96	5.530e-02	1.157e+08
90	97	2.922e-01	4.661e+08	90	98	1.766e+00	2.333e+09	90	101	6.634e-01	1.777e+09
90	104	2.687e-02	6.285e+07	90	108	4.725e-03	2.786e+07	90	117	0.000e+00	9.203e+04
90	125	0.000e+00	1.237e+05	90	128	0.000e+00	7.214e+04	90	129	0.000e+00	9.164e+04
90	145	1.352e-02	1.341e+08	90	152	1.166e-02	2.454e+08	90	153	2.746e-02	4.140e+08
90	154	2.410e-02	5.188e+08	91	92	4.278e-01	6.037e+08	91	94	1.980e-01	3.231e+08
91	95	4.875e-02	5.958e+07	91	96	7.156e-02	1.257e+08	91	101	6.227e-02	1.430e+08
91	104	1.456e+00	2.964e+09	91	105	5.933e-01	3.000e+09	91	107	2.760e-03	2.352e+07
91	109	2.975e-02	2.911e+08	91	127	0.000e+00	9.153e+04	91	132	0.000e+00	1.164e+05
91	134	6.780e-02	6.790e+08	91	139	0.000e+00	9.776e+04	91	147	0.000e+00	2.760e+05
91	157	4.840e-02	7.367e+08	91	158	1.725e-02	6.901e+08	92	110	1.039e+00	2.460e+09

(continued on next page)

Table 3 (continued)

Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)	Low. lev. <i>i</i>	Upp. lev. <i>j</i>	Osc. str. <i>gf</i>	Rad. rate (1/s)
92	111	6.383e-02	3.704e+08	92	113	1.755e-01	4.565e+08	92	114	1.036e-01	2.714e+08
92	116	1.107e-01	7.115e+08	92	118	3.033e-02	1.262e+08	92	120	4.339e-02	1.826e+08
92	123	1.843e-01	8.808e+08	92	128	2.948e-01	1.783e+09	92	132	2.551e-01	1.596e+09
92	135	1.089e-02	5.532e+07	93	111	3.003e-01	1.610e+09	93	112	4.882e-02	1.608e+08
93	119	2.923e-02	1.888e+08	93	120	2.385e-02	9.342e+07	93	123	8.619e-01	3.852e+09
93	126	1.531e-01	4.334e+09	93	129	4.259e-02	4.050e+08	93	147	6.047e-03	2.740e+08
94	110	6.218e-02	1.330e+08	94	111	8.643e-02	4.546e+08	94	112	1.944e-01	6.278e+08
94	113	1.704e-01	4.027e+08	94	114	3.907e-01	9.304e+08	94	116	7.148e-02	4.183e+08
94	119	1.594e-02	1.011e+08	94	120	2.588e-02	9.961e+07	94	122	9.635e-03	6.721e+07
94	123	4.108e-01	1.806e+09	94	124	5.529e-01	1.774e+09	94	128	6.068e-02	3.407e+08
94	129	2.343e-01	2.196e+09	94	132	9.811e-02	5.707e+08	94	135	1.221e-02	5.792e+07
95	112	1.650e-01	5.149e+08	95	113	2.425e-01	5.539e+08	95	115	1.223e+00	2.243e+09
95	121	2.658e-02	7.096e+07	95	123	5.008e-02	2.137e+08	95	124	7.367e-01	2.296e+09
95	125	5.865e-01	1.458e+09	95	127	3.096e-02	9.347e+07	95	128	1.627e-01	8.901e+08
95	132	3.385e-02	1.920e+08	95	136	3.358e-02	1.211e+08	96	110	6.721e-02	1.359e+08
96	112	2.488e-01	7.615e+08	96	113	5.223e-01	1.170e+09	96	114	3.595e-01	8.119e+08
96	116	1.982e-02	1.101e+08	96	118	3.482e-02	1.260e+08	96	123	1.883e-02	7.905e+07
96	124	7.719e-01	2.366e+09	96	128	8.037e-02	4.333e+08	96	129	1.150e-01	1.035e+09
96	132	3.061e-02	1.711e+08	96	135	1.738e-02	7.939e+07	97	110	5.012e-02	9.568e+07
97	113	1.090e-01	2.311e+08	97	114	3.618e-01	7.736e+08	97	115	9.665e-01	1.648e+09
97	121	6.702e-02	1.670e+08	97	124	2.786e-02	8.148e+07	97	125	1.369e+00	3.198e+09
97	128	1.672e-01	8.644e+08	97	132	7.268e-02	3.899e+08	97	136	2.244e-02	7.685e+07
98	113	8.101e-02	1.624e+08	98	114	4.002e-02	8.090e+07	98	115	1.247e-01	2.012e+08
98	117	2.779e+00	3.829e+09	98	124	5.839e-02	1.628e+08	98	125	8.089e-01	1.802e+09
98	137	7.784e-02	2.102e+08	99	106	2.418e-01	6.878e+08	99	107	7.173e-01	7.084e+08
99	108	1.312e+00	8.739e+08	100	111	6.405e-02	2.556e+08	100	112	3.379e-01	8.311e+08
100	118	2.996e-02	8.880e+07	100	122	2.384e-01	1.311e+09	100	126	1.953e-01	4.441e+09
100	128	2.591e-01	1.187e+09	100	129	2.009e-01	1.537e+09	100	132	5.022e-02	2.393e+08
100	147	7.890e-03	3.013e+08	101	112	3.730e-02	9.066e+07	101	113	3.028e-01	5.403e+08
101	114	3.126e-01	5.630e+08	101	121	4.386e-02	9.329e+07	101	122	3.775e-01	2.056e+09
101	124	2.676e-02	6.763e+07	101	128	5.159e-01	2.344e+09	101	129	2.396e-01	1.817e+09
101	132	4.985e-01	2.355e+09	102	111	1.178e-01	4.641e+08	102	116	1.822e-02	8.116e+07
102	122	8.813e-02	4.795e+08	102	129	2.336e-01	1.770e+09	103	109	6.540e-01	6.956e+08
104	110	3.021e-01	3.758e+08	104	114	4.127e-02	5.902e+07	104	127	2.252e+00	4.761e+09
104	128	4.924e-02	1.889e+08	104	132	1.967e-01	7.874e+08	104	139	6.794e-01	1.955e+09
105	116	3.121e-01	1.034e+09	105	118	1.946e-01	4.298e+08	105	120	2.267e-01	5.085e+08
105	122	2.726e-02	1.136e+08	105	126	9.517e-03	1.713e+08	105	128	5.896e-02	2.141e+08
105	132	2.730e-01	1.036e+09	105	147	3.762e-01	1.203e+10	106	119	5.816e-01	9.363e+08
107	118	9.442e-01	8.821e+08	107	119	4.187e-01	6.528e+08	107	120	3.573e-01	3.417e+08
107	147	3.742e-03	7.550e+07	108	118	2.295e-01	1.944e+08	108	120	1.854e-01	1.609e+08
108	121	2.296e+00	1.430e+09	109	118	3.382e-01	2.192e+08	109	120	8.764e-01	5.842e+08
109	128	1.268e-01	1.901e+08	109	132	2.314e-01	3.711e+08	109	147	7.611e-02	1.299e+09
110	138	5.372e-01	2.688e+08	110	140	2.031e-01	1.079e+08	110	157	2.686e-01	4.961e+08
111	143	2.651e-01	2.770e+08	111	151	1.256e-01	4.161e+08	112	144	3.883e-01	2.863e+08
112	152	1.940e-01	3.759e+08	112	155	4.397e-02	1.555e+08	113	138	1.467e-01	6.041e+07
113	140	2.334e-01	1.027e+08	113	145	2.813e-01	1.590e+08	113	153	1.797e-01	2.433e+08
114	138	8.322e-02	3.369e+07	114	140	3.385e-01	1.465e+08	114	145	2.421e-01	1.349e+08
115	141	9.762e-01	3.386e+08	116	146	3.072e-01	3.532e+08	116	158	2.509e-01	1.277e+09
117	141	3.498e-02	1.113e+07	117	142	1.181e+00	3.380e+08	118	131	5.356e-01	8.113e+07
118	134	4.957e-01	9.451e+07	119	130	6.033e-01	1.267e+08	120	134	6.803e-01	1.241e+08
121	133	1.248e+00	1.401e+08	122	154	2.826e-01	4.037e+08	122	155	1.709e-01	4.158e+08
122	156	5.913e-02	4.373e+08	123	148	5.601e-01	4.087e+08	124	149	7.338e-01	4.161e+08
125	150	9.604e-01	4.378e+08	127	159	1.095e+00	8.051e+08	129	156	4.474e-02	1.775e+08

Table 4

Ni XVII fractional level populations. See page 194 for Explanation of Tables.

log(Den.) Key	Population						
	8	9	10	11	12	13	14
1	9.958–01	9.958–01	9.955–01	9.933–01	9.748–01	9.183–01	8.896–01
2	4.201–03	4.203–03	4.226–03	4.444–03	6.216–03	1.165–02	1.441–02
3	7.636–12	7.636–11	7.634–10	7.610–09	7.416–08	6.821–07	6.520–06
4	2.336–06	2.336–05	2.331–04	2.283–03	1.894–02	7.006–02	9.596–02
5	4.404–13	4.404–12	4.403–11	4.393–10	4.314–09	4.070–08	3.947–07
6	2.236–17	2.237–16	2.239–15	2.265–14	2.471–13	3.103–12	3.423–11
7	4.612–14	4.613–13	4.614–12	4.628–11	4.744–10	5.100–09	5.280–08
8	8.845–16	8.860–15	9.013–14	1.051–12	2.264–11	5.989–10	7.876–09
9	3.573–15	3.576–14	3.603–13	3.868–12	6.021–11	1.263–09	1.598–08
10	1.324–16	1.324–15	1.324–14	1.326–13	1.336–12	1.369–11	1.385–10
11	1.247–15	1.247–14	1.250–13	1.280–12	1.518–11	2.250–10	2.620–09
12	1.402–15	1.402–14	1.406–13	1.448–12	1.784–11	2.814–10	3.336–09
13	1.916–15	1.918–14	1.943–13	2.185–12	4.150–11	1.018–09	1.324–08
14	1.142–14	1.142–13	1.141–12	1.139–11	1.119–10	1.056–09	1.024–08
15	2.157–16	2.158–15	2.166–14	2.243–13	2.866–12	4.781–11	5.751–10
16	1.123–16	1.124–15	1.137–14	1.260–13	2.262–12	5.335–11	6.892–10
17	1.057–16	1.058–15	1.059–14	1.073–13	1.188–12	1.540–11	1.719–10
18	7.097–17	7.158–16	7.764–15	1.369–13	6.186–12	2.097–10	2.846–09
19	7.608–18	7.608–17	7.618–16	7.709–15	8.448–14	1.072–12	1.187–11
20	3.235–17	3.236–16	3.247–15	3.358–14	4.259–13	7.023–12	8.423–11
21	1.576–17	1.580–16	1.621–15	2.022–14	5.278–13	1.527–11	2.033–10
22	1.266–18	1.275–17	1.367–16	2.268–15	9.586–14	3.204–12	4.342–11
23	1.240–17	1.242–16	1.268–15	1.515–14	3.526–13	9.696–12	1.282–10
24	2.286–17	2.290–16	2.327–15	2.692–14	5.657–13	1.476–11	1.937–10
25	1.692–16	1.692–15	1.692–14	1.692–13	1.692–12	1.690–11	1.690–10
26	8.223–17	8.223–16	8.222–15	8.216–14	8.168–13	8.021–12	7.946–11
27	9.498–19	9.498–18	9.499–17	9.513–16	9.623–15	9.962–14	1.013–12
28	6.226–19	6.227–18	6.233–17	6.291–16	6.763–15	8.213–14	8.947–13
29	7.181–19	7.183–18	7.195–17	7.311–16	8.255–15	1.115–13	1.262–12
30	3.502–17	3.501–16	3.501–15	3.494–14	3.436–13	3.258–12	3.168–11
31	1.573–19	1.573–18	1.573–17	1.571–16	1.558–15	1.516–14	1.494–13
32	2.857–19	2.857–18	2.861–17	2.895–16	3.175–15	4.035–14	4.471–13
33	1.428–17	1.428–16	1.428–15	1.426–14	1.408–13	1.354–12	1.326–11
34	1.953–18	1.953–17	1.953–16	1.956–15	1.983–14	2.066–13	2.108–12
35	8.198–18	8.198–17	8.196–16	8.178–15	8.031–14	7.581–13	7.352–12
36	6.707–18	6.708–17	6.718–16	6.817–15	7.616–14	7.007–12	1.131–11
37	4.431–16	4.431–15	4.430–14	4.420–13	4.338–12	4.087–11	3.960–10
38	1.004–17	1.004–16	1.007–15	1.033–14	1.249–13	1.909–12	2.244–11
39	5.756–17	5.756–16	5.755–15	5.747–14	5.682–13	5.481–12	5.379–11
40	3.202–17	3.205–16	3.228–15	3.453–14	5.282–13	1.090–11	1.374–10
41	6.765–17	6.765–16	6.763–15	6.749–14	6.636–13	6.288–12	6.111–11
42	2.622–18	2.622–17	2.625–16	2.648–15	2.842–14	3.434–13	3.735–12
43	6.624–18	6.624–17	6.626–16	6.652–15	6.860–14	7.497–13	7.819–12
44	5.603–18	5.605–17	5.620–16	5.767–15	6.962–14	1.063–12	1.248–11
45	1.333–16	1.333–15	1.333–14	1.330–13	1.306–12	1.234–11	1.197–10
46	7.502–19	7.506–18	7.546–17	7.933–16	1.108–14	2.075–13	2.564–12
47	4.104–19	4.104–18	4.104–17	4.107–16	4.133–15	4.214–14	4.255–13
48	2.921–20	3.299–19	7.071–18	4.393–16	3.435–14	1.263–12	1.729–11
49	9.698–19	9.698–18	9.698–17	9.694–16	9.660–15	9.555–14	9.503–13
50	3.720–18	3.720–17	3.722–16	3.740–15	3.885–14	3.329–13	4.553–12
51	4.842–18	4.842–17	4.845–16	4.871–15	5.085–14	5.740–13	6.072–12
52	6.179–18	6.180–17	6.191–16	6.296–15	7.146–14	9.755–13	1.108–11
53	5.867–17	5.867–16	5.866–15	5.853–14	5.750–13	5.432–12	5.271–11
54	1.486–19	1.486–18	1.488–17	1.510–16	1.685–15	2.222–14	2.494–13
55	1.788–19	1.788–18	1.795–17	1.854–16	2.336–15	3.815–14	4.564–13
56	4.245–19	4.245–18	4.248–17	4.277–16	4.509–15	5.220–14	5.581–13
57	5.020–20	5.020–19	5.021–18	5.034–17	5.142–16	5.473–15	5.640–14
58	6.306–20	6.313–19	6.382–18	7.055–17	1.252–15	2.931–14	3.781–13
59	2.783–19	2.788–18	2.836–17	3.308–16	7.139–15	1.890–13	2.486–12
60	3.077–19	3.080–18	3.105–17	3.356–16	5.393–15	1.165–13	1.481–12
61	4.115–20	4.131–19	4.289–18	5.840–17	1.844–15	5.710–14	7.669–13
62	1.049–18	1.049–17	1.049–16	1.051–15	1.065–14	1.108–13	1.129–12
63	5.937–19	5.937–18	5.937–17	5.929–16	5.867–15	5.678–14	5.582–13
64	3.220–19	3.220–18	3.226–17	3.280–16	3.723–15	5.081–14	5.769–13
65	7.204–20	7.204–19	7.211–18	7.272–17	7.769–16	9.294–15	1.007–13
66	1.398–19	1.399–18	1.407–17	1.478–16	2.060–15	3.846–14	4.751–13
67	2.318–19	2.318–18	2.320–17	2.340–16	2.506–15	3.016–14	3.274–13
68	1.081–19	1.082–18	1.095–17	1.217–16	2.209–15	5.253–14	6.795–13
69	1.131–19	1.133–18	1.157–17	1.387–16	3.262–15	9.017–14	1.193–12
70	2.001–18	2.006–17	2.051–16	2.493–15	6.083–14	1.710–12	2.269–11
71	3.663–19	3.663–18	3.665–17	3.678–16	3.789–15	4.127–14	4.299–13
72	6.870–20	6.884–19	7.030–18	8.456–17	2.004–15	5.561–14	7.362–13
73	1.984–19	1.985–18	1.994–17	2.079–16	2.769–15	4.889–14	5.962–13

(continued on next page)

Table 4 (continued)

log(Den.) Key	Population						
	8	9	10	11	12	13	14
74	8.240–21	8.288–20	8.769–19	1.347–17	5.169–16	1.690–14	2.284–13
75	4.727–19	4.727–18	4.729–17	4.743–16	4.861–15	5.221–14	5.403–13
76	8.180–20	8.182–19	8.208–18	8.456–17	1.048–15	1.667–14	1.981–13
77	9.428–20	9.433–19	9.478–18	9.916–17	1.348–15	2.440–14	2.993–13
78	6.742–20	6.742–19	6.751–18	6.837–17	7.531–16	9.662–15	1.074–13
79	6.361–20	6.362–19	6.372–18	6.471–17	7.270–16	9.724–15	1.097–13
80	2.003–20	2.008–19	2.063–18	2.594–17	6.910–16	2.016–14	2.687–13
81	6.076–20	6.097–19	6.315–18	8.445–17	2.575–15	7.888–14	1.058–12
82	2.356–20	2.373–19	2.543–18	4.200–17	1.766–15	5.899–14	7.992–13
83	3.673–20	3.681–19	3.762–18	4.559–17	1.103–15	3.090–14	4.096–13
84	3.958–20	3.966–19	4.037–18	4.736–17	1.041–15	2.784–14	3.667–13
85	1.479–20	1.484–19	1.528–18	1.965–17	5.511–16	1.639–14	2.191–13
86	3.296–19	3.296–18	3.299–17	3.322–16	3.516–15	4.111–14	4.412–13
87	5.567–19	5.567–18	5.567–17	5.567–16	5.570–15	5.579–14	5.584–13
88	4.734–21	4.748–20	4.890–19	6.270–18	1.748–16	5.190–15	6.934–14
89	1.240–20	1.241–19	1.253–18	1.374–17	2.355–16	5.366–15	6.892–14
90	7.688–21	7.696–20	7.772–19	8.524–18	1.463–16	3.338–15	4.288–14
91	1.065–19	1.065–18	1.065–17	1.063–16	1.052–15	1.018–14	1.000–13
92	1.950–20	1.950–19	1.949–18	1.947–17	1.923–16	1.852–15	1.816–14
93	1.733–20	1.733–19	1.733–18	1.731–17	1.722–16	1.692–15	1.677–14
94	8.183–21	8.184–20	8.189–19	8.241–18	8.665–17	9.966–16	1.063–14
95	8.168–21	8.168–20	8.175–19	8.236–18	8.732–17	1.026–15	1.103–14
96	7.744–21	7.744–20	7.748–19	7.792–18	8.150–17	9.246–16	9.801–15
97	6.505–21	6.506–20	6.515–19	6.605–18	7.331–17	9.561–16	1.069–14
98	7.744–21	7.744–20	7.746–19	7.762–18	7.894–17	8.299–16	8.504–15
99	1.914–18	1.914–17	1.914–16	1.920–15	1.964–14	2.100–13	2.169–12
100	3.597–20	3.597–19	3.596–18	3.589–17	3.533–16	3.359–15	3.271–14
101	1.268–20	1.268–19	1.268–18	1.269–17	1.280–16	1.313–15	1.330–14
102	5.372–22	5.372–21	5.374–20	5.394–19	5.554–18	6.044–17	6.292–16
103	5.377–17	5.377–16	5.376–15	5.363–14	5.264–13	4.961–12	4.807–11
104	1.298–19	1.298–18	1.298–17	1.296–16	1.280–15	1.230–14	1.205–13
105	1.780–18	1.780–17	1.779–16	1.776–15	1.745–14	1.651–13	1.603–12
106	1.630–18	1.630–17	1.633–16	1.655–15	1.841–14	2.410–13	2.698–12
107	4.819–18	4.819–17	4.819–16	4.822–15	4.846–14	4.920–13	4.958–12
108	6.491–18	6.493–17	6.514–16	6.718–15	8.378–14	1.347–12	1.605–11
109	1.078–17	1.078–16	1.078–15	1.076–14	1.057–13	9.999–13	9.709–12
110	4.036–21	4.037–20	4.040–19	4.070–18	4.315–17	5.067–16	5.448–15
111	4.828–20	4.828–19	4.830–18	4.854–17	5.044–16	5.627–15	5.923–14
112	1.002–19	1.002–18	1.003–17	1.007–16	1.039–15	1.138–14	1.188–13
113	1.110–19	1.110–18	1.111–17	1.125–16	1.240–15	1.591–14	1.769–13
114	9.993–20	9.994–19	1.001–17	1.012–16	1.102–15	1.380–14	1.520–13
115	3.296–20	3.296–19	3.297–18	3.310–17	3.409–16	3.715–15	3.870–14
116	1.955–20	1.955–19	1.956–18	1.964–17	2.036–16	2.257–15	2.369–14
117	4.373–20	4.374–19	4.378–18	4.422–17	4.775–16	5.858–15	6.407–14
118	1.142–17	1.142–16	1.141–15	1.139–14	1.124–13	1.075–12	1.050–11
119	8.999–19	8.999–18	9.004–17	9.050–16	9.422–15	1.056–13	1.114–12
120	1.378–17	1.378–16	1.377–15	1.375–14	1.354–13	1.288–12	1.255–11
121	1.893–18	1.894–17	1.897–16	1.926–15	2.165–14	2.899–13	3.270–12
122	1.045–21	1.045–20	1.047–19	1.060–18	1.169–17	1.505–16	1.675–15
123	7.885–20	7.884–19	7.883–18	7.866–17	7.730–16	7.313–15	7.102–14
124	5.161–22	5.162–21	5.173–20	5.278–19	6.127–18	8.736–17	1.006–15
125	3.193–21	3.193–20	3.193–19	3.200–18	3.255–17	3.425–16	3.510–15
126	7.874–22	7.874–21	7.872–20	7.857–19	7.732–18	7.350–17	7.156–16
127	2.257–18	2.257–17	2.257–16	2.252–15	2.215–14	2.102–13	2.045–12
128	6.570–19	6.570–18	6.569–17	6.555–16	6.441–15	6.091–14	5.914–13
129	7.676–22	7.678–21	7.688–20	7.794–19	8.652–18	1.128–16	1.262–15
130	1.494–18	1.494–17	1.494–16	1.496–15	1.517–14	1.578–13	1.610–12
131	1.995–18	1.995–17	1.995–16	2.000–15	2.032–14	2.133–13	2.185–12
132	1.025–18	1.025–17	1.025–16	1.023–15	1.005–14	9.501–14	9.222–13
133	2.593–18	2.593–17	2.595–16	2.615–15	2.775–14	3.268–13	3.518–12
134	1.254–17	1.254–16	1.254–15	1.251–14	1.230–13	1.166–12	1.133–11
135	1.682–18	1.682–17	1.682–16	1.684–15	1.704–14	1.766–13	1.797–12
136	2.090–18	2.090–17	2.090–16	2.094–15	2.124–14	2.218–13	2.266–12
137	2.569–18	2.569–17	2.570–16	2.584–15	2.698–14	3.045–13	3.221–12
138	2.281–21	2.282–20	2.283–19	2.299–18	2.424–17	2.807–16	3.001–15
139	6.760–18	6.760–17	6.759–16	6.745–15	6.633–14	6.289–13	6.115–12
140	2.873–21	2.873–20	2.876–19	2.904–18	3.132–17	3.833–16	4.188–15
141	4.280–20	4.280–19	4.283–18	4.311–17	4.534–16	5.218–15	5.565–14
142	6.391–20	6.392–19	6.402–18	6.496–17	7.262–16	9.612–15	1.080–13
143	1.078–20	1.078–19	1.078–18	1.085–17	1.135–16	1.288–15	1.366–14
144	1.363–20	1.363–19	1.364–18	1.374–17	1.448–16	1.678–15	1.794–14
145	1.606–20	1.606–19	1.609–18	1.642–17	1.907–16	2.722–15	3.135–14
146	4.147–22	4.147–21	4.150–20	4.176–19	4.392–18	5.053–17	5.389–16
147	1.409–19	1.409–18	1.408–17	1.405–16	1.379–15	1.300–14	1.260–13

Table 4 (continued)

log(Den.) Key	Population						
	8	9	10	11	12	13	14
148	4.505–21	4.505–20	4.504–19	4.496–18	4.427–17	4.217–16	4.110–15
149	9.317–23	9.319–22	9.343–21	9.574–20	1.145–18	1.722–17	2.014–16
150	1.049–22	1.049–21	1.051–20	1.076–19	1.273–18	1.880–17	2.187–16
151	1.588–22	1.588–21	1.588–20	1.591–19	1.611–18	1.673–17	1.705–16
152	3.509–22	3.510–21	3.513–20	3.552–19	3.863–18	4.818–17	5.301–16
153	8.245–21	8.245–20	8.244–19	8.237–18	8.174–17	7.983–16	7.886–15
154	1.014–21	1.014–20	1.015–19	1.027–18	1.122–17	1.416–16	1.565–15
155	6.439–22	6.440–21	6.449–20	6.537–19	7.248–18	9.431–17	1.054–15
156	2.333–22	2.333–21	2.337–20	2.375–19	2.687–18	3.642–17	4.126–16
157	3.863–19	3.862–18	3.862–17	3.854–16	3.789–15	3.592–14	3.492–13
158	2.230–22	2.230–21	2.230–20	2.232–19	2.249–18	2.301–17	2.327–16
159	3.088–22	3.088–21	3.090–20	3.104–19	3.222–18	3.585–17	3.768–16

Table 5

Intensities of selected bright Ni XVII lines. See page 194 for Explanation of Tables.

log(Den.)			Intensity						
<i>j</i>	<i>i</i>	Wavelength	8	9	10	11	12	13	14
103	5	36.694	1.23–05	1.23–04	1.23–03	1.23–02	1.21–01	1.14+00	1.10+01
134	14	40.954	5.18–06	5.18–05	5.18–04	5.17–03	5.08–02	4.81–01	4.68+00
41	1	42.886	2.51–05	2.51–04	2.51–03	2.51–02	2.46–01	2.33+00	2.27+01
39	1	43.088	8.80–06	8.80–05	8.80–04	8.79–03	8.69–02	8.38–01	8.22+00
43	3	44.994	3.59–06	3.59–05	3.59–04	3.60–03	3.72–02	4.06–01	4.24+00
44	4	45.380	4.05–06	4.05–05	4.06–04	4.17–03	5.03–02	7.68–01	9.02+00
45	5	47.663	5.56–05	5.56–04	5.56–03	5.55–02	5.45–01	5.14+00	4.99+01
53	7	50.954	1.92–05	1.92–04	1.92–03	1.92–02	1.88–01	1.78+00	1.73+01
53	9	51.764	5.38–06	5.38–05	5.38–04	5.37–03	5.27–02	4.98–01	4.83+00
36	4	52.803	1.94–06	1.94–05	1.95–04	1.97–03	2.21–02	2.92–01	3.28+00
48	9	53.477	5.87–09	6.63–08	1.42–06	8.83–05	6.90–03	2.54–01	3.47+00
50	11	55.140	4.44–06	4.44–05	4.44–04	4.46–03	4.63–02	5.16–01	5.43+00
51	12	55.180	6.12–06	6.12–05	6.12–04	6.15–03	6.42–02	7.25–01	7.67+00
52	13	55.250	8.78–06	8.78–05	8.80–04	8.95–03	1.02–01	1.39+00	1.57+01
37	5	55.350	1.50–04	1.50–03	1.50–02	1.50–01	1.47+00	1.38+01	1.34+02
53	14	57.574	5.70–05	5.70–04	5.70–03	5.69–02	5.59–01	5.28+00	5.12+01
41	7	59.069	3.51–06	3.51–05	3.51–04	3.50–03	3.44–02	3.26–01	3.17+00
40	13	64.344	2.76–06	2.77–05	2.79–04	2.98–03	4.56–02	9.40–01	1.19+01
39	12	64.671	3.36–06	3.36–05	3.36–04	3.35–03	3.32–02	3.20–01	3.14+00
103	41	125.101	4.53–06	4.53–05	4.52–04	4.51–03	4.43–02	4.18–01	4.05+00
14	3	168.967	7.69–06	7.69–05	7.69–04	7.67–03	7.53–02	7.11–01	6.89+00
25	7	175.378	3.82–06	3.82–05	3.82–04	3.82–03	3.81–02	3.81–01	3.81+00
11	2	197.303	2.04–05	2.04–04	2.05–03	2.10–02	2.49–01	3.68+00	4.29+01
12	3	199.873	2.96–05	2.96–04	2.97–03	3.06–02	3.77–01	5.95+00	7.05+01
11	3	200.548	1.44–05	1.44–04	1.44–03	1.47–02	1.75–01	2.59+00	3.02+01
13	4	207.520	4.85–05	4.85–04	4.92–03	5.53–02	1.05+00	2.58+01	3.35+02
12	4	208.652	8.74–06	8.75–05	8.77–04	9.03–03	1.11–01	1.76+00	2.08+01
24	9	214.084	4.81–07	4.82–06	4.90–05	5.67–04	1.19–02	3.11–01	4.08+00
21	9	215.406	4.16–07	4.17–06	4.27–05	5.33–04	1.39–02	4.03–01	5.36+00
14	5	215.910	5.70–04	5.70–03	5.69–02	5.68–01	5.58+00	5.27+01	5.11+02
5	1	249.186	1.21–02	1.21–01	1.21+00	1.21+01	1.19+02	1.12+03	1.09+04
9	3	251.952	1.94–05	1.94–04	1.95–03	2.10–02	3.26–01	6.84+00	8.65+01
8	2	263.591	7.71–06	7.72–05	7.85–04	9.15–03	1.97–01	5.22+00	6.86+01
9	4	266.065	5.49–05	5.50–04	5.54–03	5.95–02	9.25–01	1.94+01	2.46+02
8	3	269.417	5.37–06	5.38–05	5.47–04	6.38–03	1.37–01	3.64+00	4.78+01
7	3	273.086	7.76–05	7.76–04	7.77–03	7.79–02	7.98–01	8.58+00	8.89+01
10	5	283.122	3.28–06	3.28–05	3.28–04	3.28–03	3.31–02	3.39–01	3.43+00
8	4	285.616	7.50–06	7.52–05	7.65–04	8.91–03	1.92–01	5.08+00	6.68+01
7	4	289.743	1.26–04	1.26–03	1.26–02	1.26–01	1.29+00	1.39+01	1.44+02
25	14	290.233	3.64–06	3.64–05	3.64–04	3.64–03	3.64–02	3.63–01	3.63+00
18	13	322.020	5.08–07	5.12–06	5.55–05	9.79–04	4.42–02	1.50+00	2.04+01
16	12	338.205	5.42–07	5.43–06	5.49–05	6.08–04	1.09–02	2.57–01	3.33+00
3	1	366.793	6.03–04	6.03–03	6.03–02	6.01–01	5.86+00	5.39+01	5.15+02
9	5	372.819	2.46–06	2.46–05	2.48–04	2.67–03	4.15–02	8.70–01	1.10+01
7	5	421.032	7.86–05	7.86–04	7.86–03	7.88–02	8.08–01	8.68+00	8.99+01
4	3	4750.151	2.83–04	2.83–03	2.82–02	2.76–01	2.29+00	8.48+00	1.16+01